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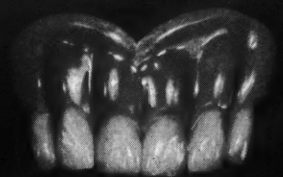
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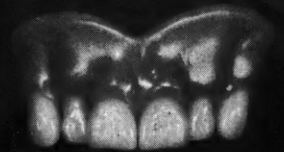
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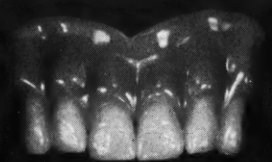
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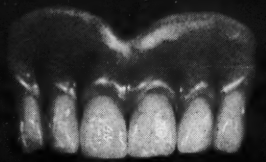
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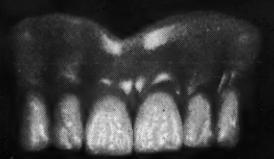
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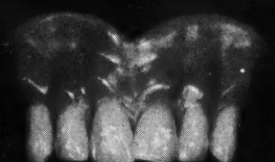
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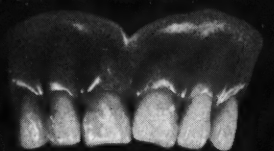
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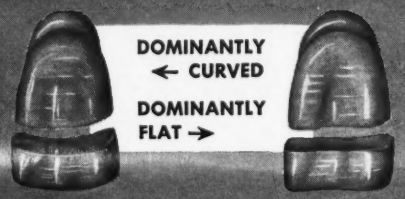

FIVE-PHASE
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About Our CONTRIBUTORS

GREGORY B. SALISBURY, D.D.S. (Temple University, School of Dentistry, 1934) who pioneered in the use of acrylic materials in dentistry has published extensively on this subject. His article in the current issue describes in detail a nonpressure technique for direct acrylic restorations.

DEANE E. DOOLEN, D.D.S. (University of Illinois, College of Dentistry, 1924) a past-president of the G. V. Black District Dental Society, presents DELAYED HEALING DUE TO CORTISONE THERAPY, a case history describing the effects of cortisone therapy on the healing response in oral surgery.

JOSEPH D. LIEBERMAN, D.D.S. (University of Nancy, France, Faculty of Medicine, 1935); D.D.S. (University of Montreal, Faculty of Dentistry, 1938); D.D.S. (Dalhousie University, Nova Scotia, 1941) who emphasizes prosthetics in his practice appears for the first time in DIGEST this month, presenting a liberally illustrated article, IMMEDIATE DENTURE SERVICE BY THE GENERAL PRACTITIONER.

JACK FEDER, D.D.S. (Northwestern University, Dental School, 1935) believes his own hobbies, sculpturing and painting, are ideal for dentists. Doctor Feder publishes in DIGEST for the first time this month, describing a device of his own invention, a magnetic board to be used in the visual education of dental patients, in clinics, and for other educational purposes.

MURRAY N. RUBINSTEIN, D.D.S. (New York University, College of Dentistry, 1924) who emphasizes restorative dentistry in his practice, publishes a detailed report of a case of occlusal reconstruction which was completed several years ago and which has therefore been adequately tested for permanence. OCCLUSAL REHABILITATION IN PRACTICE is Doctor Rubinstein's third article to appear in DIGEST.

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Nonpressure Technique *in* DIRECT ACRYLIC RESTORATIONS

GREGORY B. SALISBURY, D.D.S., Philadelphia

DIGEST

Considerable research has been conducted and definite advances have been made in the technique involving the use of self-curing acrylics. A more thorough knowledge of the properties of the material has been acquired by dentists and it is realized that to complete a direct acrylic restoration sufficient time is required, at least twice as much as the technique employing silicate, and usually more than that.

This article gives specific directions for a satisfactory nonpressure procedure which has overcome most of the difficult problems connected with the use of this valuable dental material.

Technical Improvements

Since the last report on direct acrylic restorations in DENTAL DIGEST in May 1950[1] much effort has been expended to eliminate the imperfections in the technique. The recent introduction of the nonpressure technique has been an important factor in neutralizing the following conditions:

1. Premature release or removal of matrix
2. Improper removal or nonremoval of gingival flash
3. Premature finishing
4. Confusing mass of matrixes and pressure clamps
5. Shrinkage during polymerization

Knowledge of Chemical Properties Required—For proper construction of direct acrylic restorations the operator must have a thorough knowledge of the physical and chemical properties of the resin employed. Most of the failures of the past were due to the fact that the operators used resins as they had used the silicates. To insert a satisfactory direct acrylic restoration requires time, at least twice as much time as the silicate and generally much more than that. Haste invariably produces a failure.

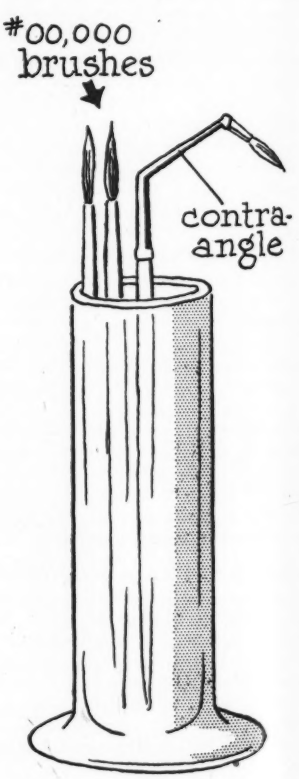
Less Irritating than Silicates—Recent studies sponsored by the Councils on Dental Therapeutics and Dental Research[2] absolved the resins of harm to the pulp, a long-standing fear of operators who used acrylic. Resins were found to be less irritating than the silicates and the phosphate cements, they did not stain, and they were virtually insoluble in oral fluids. The chief criticism of the material was that of shrinkage and improper handling by the operators.

Temperature Rise not Injurious—In a report on research study sponsored jointly by the National Bureau of Standards, Federal Dental Services, and the American Dental Association[3] it is stated that "the rise in temperature of restorations made of the most rapidly polymerizing resin reaches only a few degrees above normal mouth temperature, and is not enough to be of any serious consequence to the welfare of the pulp."

Technical Methods Recommended—Dimensional change of shrinkage was deplored and operators were cautioned to hold the strip immobile until a test piece held in the hand became hard. Disturbances of the restoration before fifteen to thirty minutes had passed were discouraged.

Elimination of Problems

The nonpressure technique developed by Frank Nealon, D.D.S. promises to eliminate the vexing problems connected with the direct acrylic technique: 1. A small sable brush is



[1]Salisbury, Gregory B.: Present Status of Direct Acrylic Restorations, DENTAL DIGEST **56**:202-209 (May) 1950.

[2]Editorial, J.A.D.A. **42**:323-324 (March) 1951.

[3]Council on Dental Research and Council on Dental Therapeutics: Status Report on the Reactions of the Pulp to the Self-curing Resinous Filling Materials **42**:449-450 (April) 1951.

used to moisten the cavity floor and walls with monomer. 2. Powdered particles of polymer are then picked up by the tip of the wet brush. 3. The restoration is built up in successive layers of acrylic without the use of matrixes. This method ensures the following conditions:

1. The greatest adaptation to the cavity walls; rounded retention undercuts producing maximum retention; molecular lock into the rough dentin; the covering of all surface irregularities; elimination of voids and trapped air in packing.

2. The material is denser; no air is trapped in the restoration mass which occurs with the conventional mix on the slab or in the jar.

3. Shrinkage is toward the cavity walls rather than away from them as it sets directional shrinkage to the walls.

4. Elimination of matrixes and pressure clamps which if moved during the setting will cause failure of the restoration. The factor of improperly applied matrixes is also eliminated.

5. Elimination of excess material, especially the gingival flash which is difficult to see and to remove.

6. Restorations can be easily built up to proper contour as the operator is afforded complete visibility in each step of the procedure.

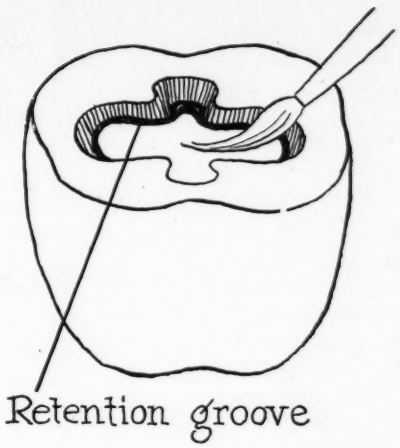
7. Any color error can be rectified by altering the blend.

8. Dark, translucent interproximals can be corrected by use of stains at the half-way point in the technique.

9. Nonpressure and the conventional techniques can be combined in difficult cases, employing the advantages of both.

Specific Procedures Employed

Armamentarium—Methods for completing various types of restorations are simple. The author has found that attaching the end of a small sable brush to a contra-angle plugger or explorer is of definite aid in reaching lingual locks and other somewhat inaccessible places. A hole drilled into the wood, encased by the metal holding the bristles, should fit the instrument.



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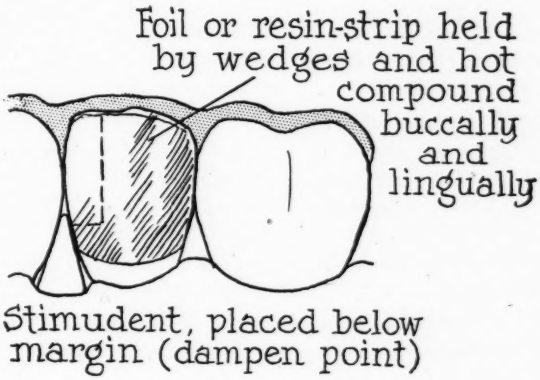

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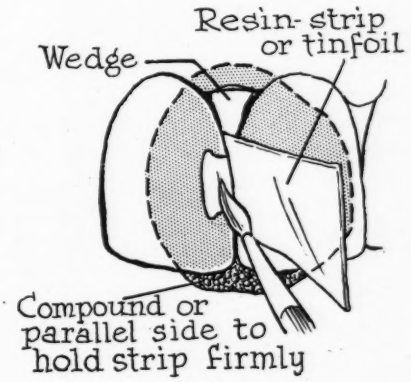


CLASS III

Cementing medium such as DuPont's cement will hold it securely. The operator may devise the armamentarium of his choice.

The following are the steps recommended to be taken in restoring the various classes of cavities:

Class I—1. Prepare the cavity with square margins and with continuous rounded retention. Avoid sharp undercuts. If phenol or any other essential oil is used for sterilization, wash out thoroughly with alcohol and dry well before placing the restoration. A trace of phenol or thymol will produce a gummy mass.

2. Place a sufficient amount of direct acrylic in a dappen dish. Knock against a table to settle particles.

3. Deposit 5 to 8 drops of liquid in a dappen dish. The amount depends on the size of the cavity.

4. Dip one millimeter of the small sable brush (00 or 000) into the liquid.

5. Moisten the inside of the cavity until all surfaces are glossy.

6. Wet the tip of the brush again and gather up a millimeter ball of powder on the tip.

7. Place in the cavity. The material will unite and flow as soon as it touches the glossy surfaces. If it does not, add a little more liquid to the cavity walls and repeat the process. Add continuous layers of acrylic, waiting ten to fifteen seconds between successive layers.

8. Continue the process until the proper contour is reached. Add some excess to allow for finishing. Use a wet brush over the restoration and the liquid will produce a smooth surface.

9. Foil the restoration to eliminate loss of liquid by evaporation.

10. Adjust occlusion after twenty to thirty minutes.

11. Finish and polish, preferably at another sitting.

12. Do not use remainder of powder and liquid. Discard it.

Class II—Because of the esthetics, a Class II restoration is sometimes necessary as with the first bicuspids. In such cases the following steps may be taken:

1. Prepare the cavity in the usual manner but avoid a narrow isthmus occlusally and produce a rounded continuous undercut for retention all around the cavity.

2. Place several layers of acrylic as described previously, especially at the gingival.

3. Place a thin resin strip or tin foil interproximally, secure well at the gingiva with wedges, and adopt to contour with the aid of hot sticky modeling compound. The four-walled cavity is now restored by the nonpressure technique and the occlusal is covered by the foil.

4. Finish in the same manner as in Class I.

Class III—Use foil interproximally and wedge at the gingival margin. Adapt to the lingual wall or palatal wall with hot compound. A four-walled cavity is the result. Proceed as in Class I. The cavity preparation must have a continuous rounded retention undercut.

Sometimes proximals appear a trifle too dark due to the translucent acrylic. This can be overcome by the following method:

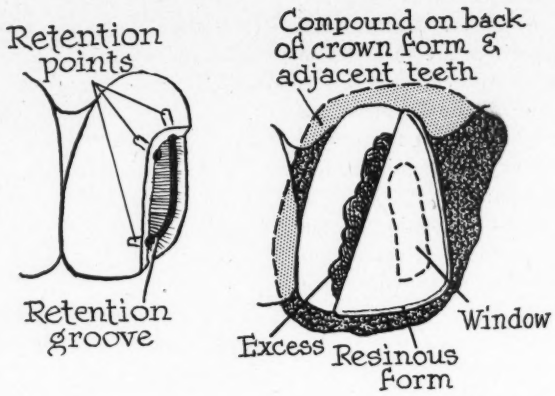
1. When the restoration is half completed, add a little acrylic stain, three parts white to one part yellow for Shade 21.

2. Add a couple of layers of this powder and the regular liquid used before.

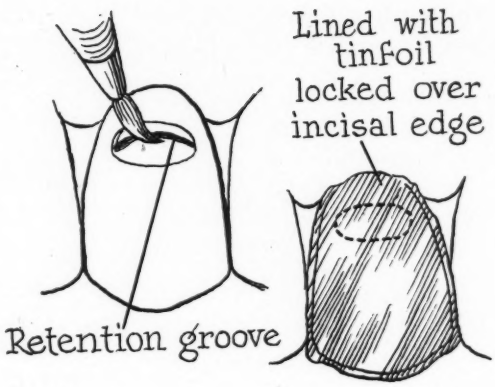
3. Continue with the nonpressure technique.

4. When finished with the contour, fold over the foil covering up the acrylic. Finish as before.

Class IV—This restoration can be



CLASS IV



CLASS V

completed entirely by the nonpressure method but the following technique is highly effective:

1. Adapt and place a resinform crown on the tooth, thin it down at the contact point with a sandpaper disc.

2. Place it in position and apply a wedge at the gingival margin. Hold in position with hot compound on the lingual or palatal.

3. Cut out a labial window and restore as a four-walled cavity.

4. Add stain as in the Class III technique to avoid darkening.

5. If the lock is present in the preparation, build up successive layers in the lock almost to the contour, prior to adapting the crown form. Complete the restoration through the labial window.

Alternate Method—The nonpressure and the pressure techniques can be combined in Class IV restorations:

1. Fill all retention grooves, cavity walls, and the lock with a nonpressure veneer.

2. Make a thin mix, place in the crown form and push it up, holding it with one hand while swiftly removing the gingival excess with an explorer.

Class V—The Class V restoration is ideally suited for a nonpressure technique for the following reasons:

1. It presents four walls, is simple to fill and contour, and is well adapted to the translucency of the acrylic.

2. The colors come out well at the gingival and defy detection.

3. Building up to the correct contour, foiling, and finishing is easy.

4. Gingival aprons of excess, bleeding, loosening due to bleeding and to shifted pressure clamps or matrixes, no longer present difficulties to the operator.

Final Steps

1. It is important to throw away any powder and liquid left after the restoration is completed. Pouring the liquid back into the bottle or the powder back into the container will contaminate both and render them unfit for further use. It is far better to place less material in the dappen dish and add to it from the supply bottle, placed near by, than to waste the ingredients. A little experience will enable one to gauge approximate amounts needed.

2. When finishing the restorations the laws of slow speeds of the handpiece, lubricated stones, bur, and discs or strips must be observed. All these instruments should be clean and free from amalgam, grit, or any other particles of waste. It is advisable to have a set of finishing implements used only for the acrylic technique. Polish with felt wheels and resin polish, using slow speeds.

49th and Locust Streets.

A Saliva Test for Prenatal Sex Determination

GUSTAV WILLIAM RAPP, Ph.D., and GARWOOD C. RICHARDSON, M.D., Chicago

The Richardson test depends on the presence of free estrone in contrast to bound or modified estrone or similar 17-ketosteroids in the female urine. This level of free estrone substances rises sharply soon after conception, the test being positive in as little as two weeks after conception, sometimes even before the first missed menstrual period. To determine whether the free estrone level rose in other body fluids, blood and urine and such fluids as saliva, tears, and perspiration were investigated.

Results of Study in Saliva

It was noted early in the study of saliva that in only some of the women who were in their sixth or seventh month of pregnancy did the Richardson test prove positive when the saliva was tested. In each of these cases, however, the test was positive on the urine.

Answer to Problem Forthcoming After Delivery—The apparent answer to this problem was forthcoming only after the delivery of the child; in nearly every case the positive tests were associated with a male child, and most of the negative tests were associated with a female child. A detailed study followed, the results of which are shown in the following Table:

Table

Relation Between Sex of Child and Reaction of the Mother's Saliva to the Richardson Test

	Positive	Negative
Males	218	3
Females	7	148

Substance Responsible Unknown—The precise nature of the substance for the positive test is not known. It is believed that some androgenic substance is being identified, since whereas a nongravid female normally yields a negative test, after the injection of testosterone or androsterone a strongly positive reaction results. The male saliva, spermatic fluid, and blood serum are all strong positive reactors.

Hormones Screened Out—The selective excretion of certain blood constituents through the salivary gland is well known. These findings illustrate a rather delicate selectivity of female salivary glands in their capacity to screen out certain female-associated hormones, but to allow certain male associated ones to pass into the salivary fluid.

Conclusion

Because of their practical nature, the findings reported preliminarily herein are presented to allow early verification by other investigators. Adapted from *Science* **115**:265 (March 7) 1952.

DELAYED HEALING

Due to Cortisone Therapy

DEANE E. DOOLEN, D.D.S., Lincoln, Illinois

Case History

The patient, an active business woman aged sixty years, presented herself in the dental office crippled with arthritis and suffering severe pains in her knee and hip joints.

Immediate Complaint—The patient's immediate complaint was of a lateral abscess located in the area mesial and buccal to the upper right second molar.

Examination—Oral examination revealed (1) the crown of the upper right central incisor, which supported a bridge to the right second bicuspid, was completely severed at the cervix, and (2) the pulp of the upper left second molar was exposed from caries. Radiographic examination verified these conditions (Fig. 1).

Extraction Advised—Because the few remaining teeth were extremely fragile, extraction of all the upper teeth was advised. After penicillin therapy the upper right first and second molars were extracted. Later the upper left first bicuspid and first and second molars were removed.

Slow Healing of Maxilla

Four weeks later when the patient presented to have the impressions made for an immediate denture her health was improved and she stated that she had been free from rheumatic pains. Oral examination revealed that there had been extremely slow healing of the maxilla following the extractions. The alveoli resembled that of a normal mouth only five or six days after the extraction of teeth.

Further Extractions

Considering the physical status of the patient the postextraction conditions were not entirely unexpected but they were sufficiently disturbing to make further surgery doubtful. However, the pulp of the broken incisor was becoming inflamed. It was therefore necessary to extract the four remaining teeth and insert the immediate denture.

Following these extractions the patient had no pain from the sockets but she returned to the office several times complaining of too much pressure on the periphery of the denture in the area of the first molar. On examination, no inflammation in this region was found and not until disclosing wax was used was it evident that the pain from pressure was real.

Partial Healing After Six Weeks

After six weeks the sockets of the extracted teeth, including the maxillary molars, were still only partly healed (Figs. 2 and 3). The soft tissue was similar in appearance to that of mucous membrane covering an area of osteomyelitis. However, there were no spiculi of bone near the surface.

Cortisone Therapy—In response to questioning the patient stated that since the beginning of the extraction procedure she had been receiving 100 milligrams of cortisone daily.

As a result of the cortisone therapy the deforming symptoms of rheumatoid arthritis had been eliminated but the delay in healing evident in the patient's mouth was also a result.

Dosage Reduced—(1) By reducing the daily consumption of cortisone to 50 milligrams and less, and (2) by

1. *Preoperative roentgenograms.*

2 and 3. *Show delayed wound healing six weeks after extraction.*

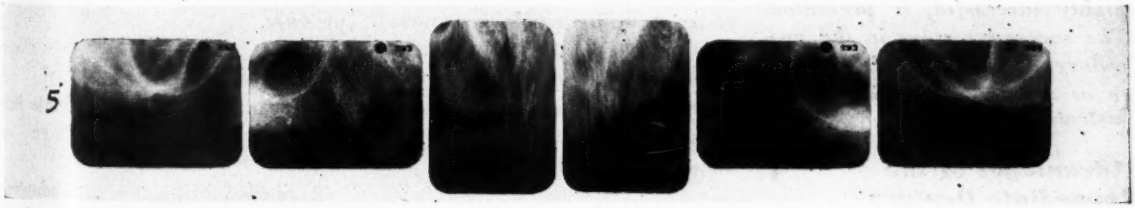
the administration of antibiotics, the patient showed a gradual improvement. After thirty days her maxilla had entirely healed (Figs. 4 and 5) but the mucous membrane and even the skin of her face showed a lack of normal tone.

Conclusion

Because the application of large doses of cortisone usually causes (1) a masking of symptoms, (2) delayed healing, (3) marked retention of fluids, and (4) possibly many other unfavorable manifestations, the extraction of teeth, and in particular the insertion of immediate dentures, is contraindicated during the administration of cortisone therapy.

112 *North Kickapoo Street.*

4 and 5. *Show satisfactory healing following reduction in the dosage of cortisone.*



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IMMEDIATE DENTURE SERVICE

by the General Practitioner

JOSEPH D. LIEBERMAN, D.D.S., New York

DIGEST

The patient who loses his teeth need not be subjected to a difficult edentulous period of healing. Progress in dental surgery and the use of a variety of new materials and available medication eliminate the prospect of (1) temporary disfiguration, (2) discomfort, and (3) psychologic disturbances. It is also essential to preserve the muscle tone and surrounding structures and to protect the temporomandibular joint from the dangers of reduced vertical dimension.

The step-by-step procedure evolved by the author for the construction of an immediate denture which can be accomplished by the general practitioner, and which has been found highly successful, is presented. The successive steps in the procedure which the author refers to as a bone impression are illustrated.

Advantages of the Immediate Denture

With the use of an immediate denture the teeth can be placed in their former position; in this way the same contour, size, shape, and individual relational inclinations as the natural teeth can be obtained. It is possible to provide satisfactory ridges for the following reasons: (1) because the alveolar resorption is less and there is better control of bone shrinkage, (2) there is usually less pain because the denture acts as a protective splint for the open wound and thus aids the healing process, and (3) the patient recovers from the shock of a surgical operation and learns to manipulate dentures at the same time.[1]

Preparation of the Patient

When a patient presents himself for denture service a full mouth x-ray is necessary, and impressions and mounted models are required. The assistance of an oral surgeon is indicated should the following conditions exist:

1. Excessively large tuberosity
2. Torus palatinus
3. High muscle attachments

After correction of these conditions by the surgeon the general practitioner may proceed. Before taking the impressions for immediate dentures, all posterior teeth should be extracted. This should be followed by a waiting period of three to six weeks, to be determined by the number of teeth extracted and the condition of the supporting structures.

Procedure

The procedure which the author has found highly successful, described as a bone impression, includes the following steps:

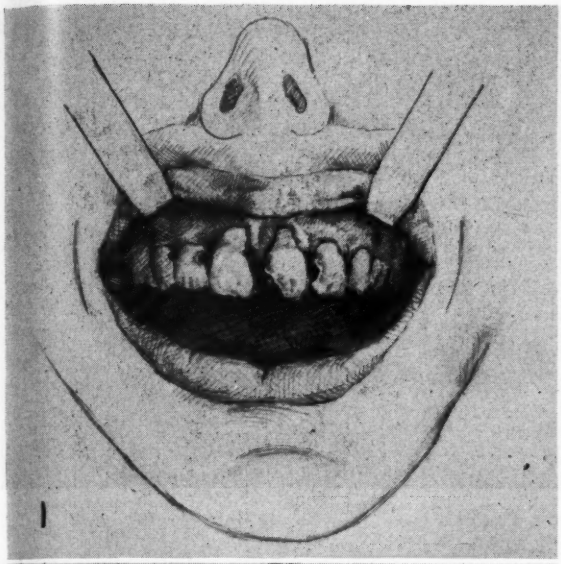
1. Take a compound snap impression.
2. Cut out the anterior section where teeth are still present.
3. Thin out the buccal flanges and trim 2 or 3 millimeters of the heights.
4. Reheat the palatal surface of the compound impression to a depth of 2 to 3 millimeters with a hand torch.
5. Reseat the impression with constant firm pressure. The reheated compound will flow slightly over the borders.
6. Cool the compound.
7. Reheat the upper border of the buccal flanges to a depth of 2 to 3 millimeters.
8. Reseat the impression, pressing firmly.
9. Add some compound to the tuberosity area and carry it high into the ridges. The correct sequence of these consecutive stages will ensure a successful bone impression.
10. The final phase is an alginate impression. Fill the anterior area (previously cut out in step 2) with alginate, covering the entire surface slightly. Seat in the mouth without pressure.

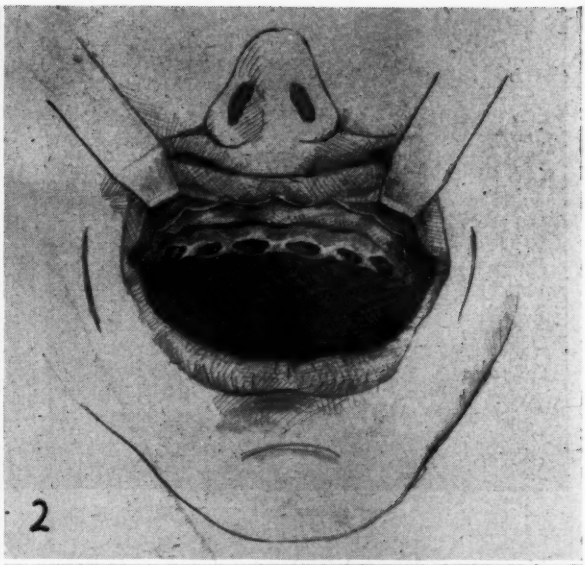
Alternative Procedure[2]

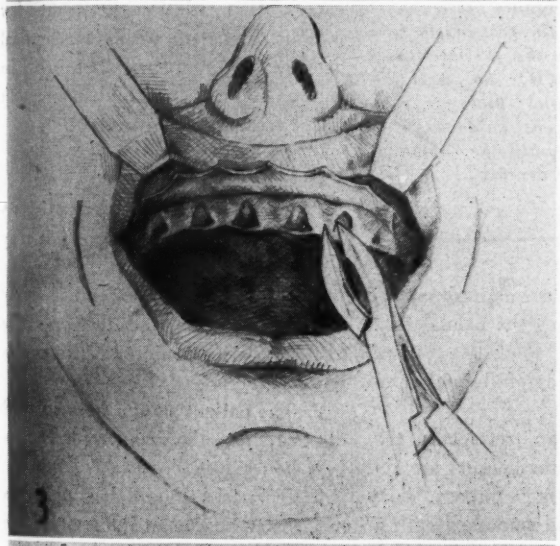
1. Take a preliminary alginate impression from which casts are run in plaster.
2. Shellac baseplates are adapted to the casts to form trays for final impressions. The trays should cover the denture-supporting area to within 1/16 of an inch lingual to the remaining anterior teeth and should not include any of the area to be involved in the surgery. The trays should be adjusted in the mouth.
3. The tray is loaded with zinc

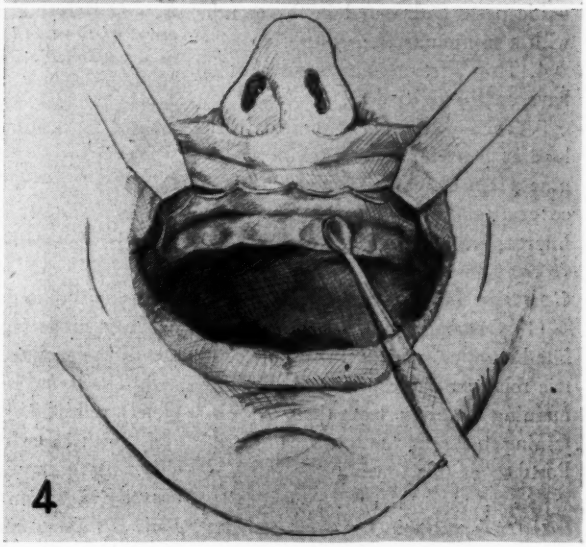
[1] Bourgoyne, J. R.: Alveoplasty in Preparation for the Immediate Denture Insertion, J. Prosthetic Dent. 1:259 (May) 1951.

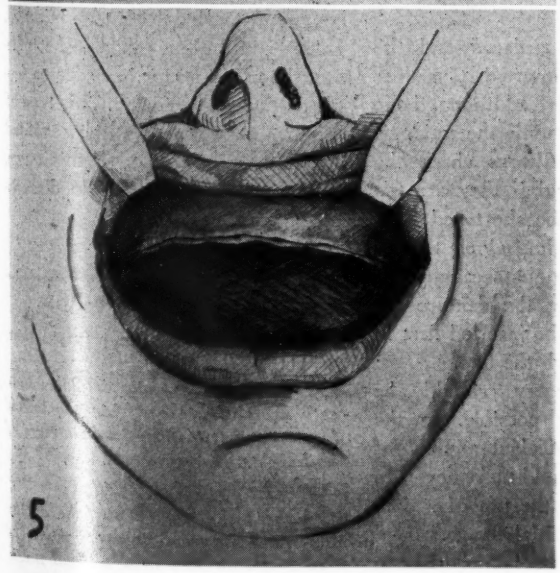
[2] Hughes, F. C.: The Transition From Natural to Prosthetic Dentures, J. Prosthetic Dent. 1:147 (January) 1951.











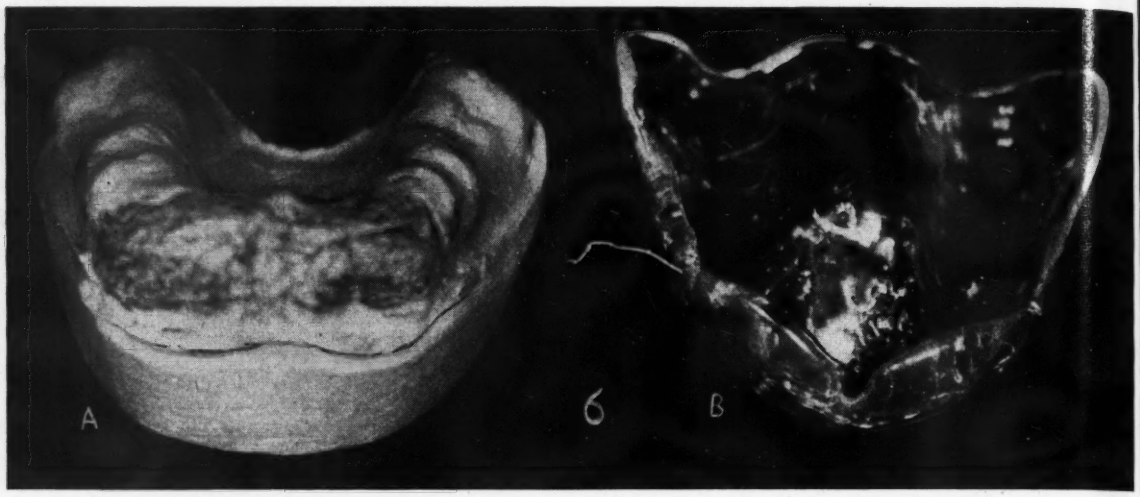
1. ***Shows the conditions before extraction.***

2. ***The anterior teeth are removed and a longitudinal incision is made along the palatal border of the sockets.***

3. ***With the flap retracted, the sharp margins of the sockets are removed with rongeur forceps.***

4. ***The bone is thinned and smoothed with a sharp bone file.***

5. ***The flap is returned to place; no sutures are necessary.***



6. *(A) Before beginning the arrangement of the teeth, the cast is trimmed in accordance with the proposed surgical procedure. (B) To facilitate trimming the labial plate in the mouth, a translucent guide is constructed which should be identical with the immediate denture.*

oxide paste and seated in the mouth with a minimum of pressure.

4. This partial impression should have complete borders.

5. The operation is finished by loading a perforated tray with an alginate impression material and totally covering the previously seated partial impression and the anterior teeth.

Centric Relation

(1) Casts are poured in stone, (2) bite-blocks constructed, and (3) centric relations are established. The remaining anterior teeth help in obtaining an accurate centric record. Postdam at this time.

Selection and Arrangement of Teeth

1. Before beginning the arrangement of the teeth, the cast is trimmed in accordance with the proposed surgical procedure.

2. The trimming should be done with definite objectives in mind: (A) The removal of the remaining anterior teeth with sufficient labial alveolar bone to permit placing the denture with a labial flange, and (B) to avoid a displeasing lip contour.

Surgery

1. To facilitate trimming the labial plate in the mouth, a translucent guide is constructed which should be an exact duplicate of the immediate denture.

2. The remaining anterior teeth are removed and a longitudinal incision is made along the palatal border of the sockets.

3. The tissue is carefully and completely reflected.

4. With the flap retracted, the sharp margins of the sockets are removed with rongeur forceps. The bone is thinned and smoothed with a sharp bone file.

5. The flap is replaced and the translucent guide inserted. If it does not seat completely, additional bone must be removed until the guide is perfectly seated. Always check the lips of the flap and if they are too long they should be shortened until they form a thin line along the incision. Sutures are not necessary.

6. When placing the denture the labial part should be inserted first in order not to disturb the flap.

7. Radical surgery should be avoided whenever possible. In the average case a sufficient amount of the labial bone should be removed in order to facilitate the use of a denture with a thin labial flange.

8. The normal resorption of bone takes place within the next few months. When the secondary or final denture is constructed there will be enough room for a labial flange with a thick rounded border.

Postoperative Care

Little postoperative care is required. The following measures may be taken:

1. When placing the denture, spray both the denture and the operative site freely with penicillin-sulfonamide powder.

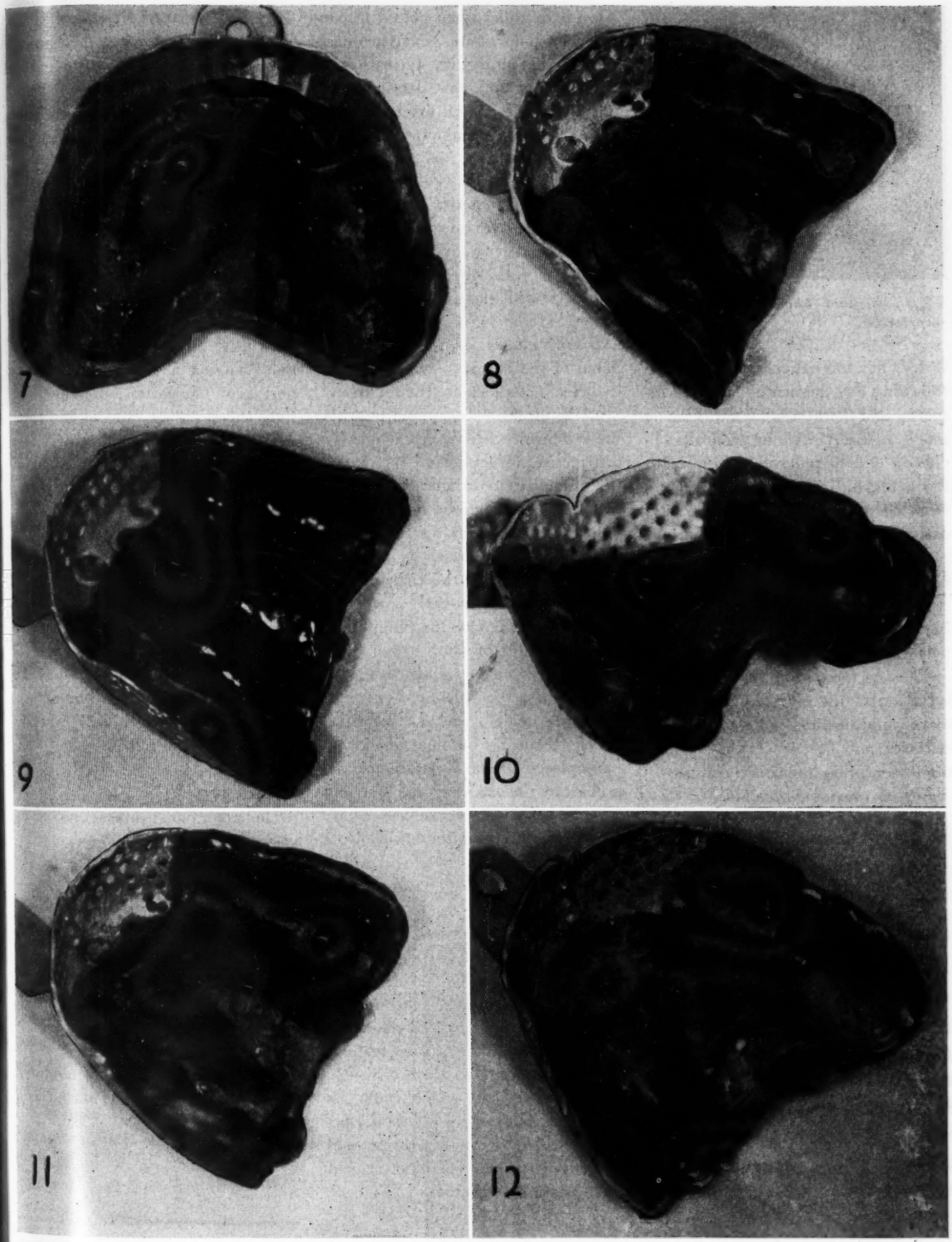
2. The patient should be instructed not to remove the denture for twenty-four hours.

3. Ice packs should be applied to the treated region at intervals of one hour for periods of ten minutes. These applications should be continued for six hours in order to lessen postoperative edema. This type of swelling cannot be entirely avoided but it can be kept to a minimum. There is usually very little discomfort.

7. *Take a compound snap impression.*

8. *Cut out the anterior section where teeth are still present, thin the buccal flanges, and trim 2 to 3 millimeters of the heights.*

9. *Reheat the palatal surface of the compound impression to a depth of 2 to 3 millimeters with a hand torch.*



10. *Reseat the impression with constant firm pressure. The reheated compound will flow slightly over the borders.*

11. *Reheat the upper border of the buccal flanges to a depth of 2 to 3 millimeters. Reseat the impression, pressing firmly. Add some compound to the tuberosity area and carry it high into the ridges.*

12. *In order to facilitate the adhesion of alginate, heat the compound slightly and stick a few strands of cotton to it.*

13. ***The final phase is an alginate impression.***

4. When the patient returns on the following day the denture may be removed and the necessary adjustments made. It is advisable to grind the occlusion and to remove high spots in the denture.

5. The patient should be examined daily for a three to four-day period.

Conclusion

1. A method is described for an immediate denture procedure to be performed by the general practitioner.

2. From the standpoint of (1) preservation of the alveolar ridges, (2) more rapid healing of the tissue, (3) esthetics, and (4) general comfort of the patient, this immediate denture is indicated whenever possible.

3. The skill and ability necessary for the surgical preparation of the mouth and for immediate denture insertion is within the scope of the general practitioner.

667 Madison Avenue.

Effect of Calcium Hydroxide-methyl Cellulose Paste on Dental Pulp

HAROLD BERK, D.D.S., Boston

Pulp Healing Stimulated

Previous studies have shown that calcium hydroxide, when placed in contact with pulp tissue, stimulates healing of the pulp with formation of odontoblasts and new dentin. Calcium hydroxide is used extensively for pulp capping and pulpotomy with excellent results.

Present Methods of Use

Calcium hydroxide is applied to the pulp either in dry powder form or mixed with distilled water, tap water, or with physiologic saline solution.

Disadvantages of the Methods—Some of the disadvantages presented by present methods are the following:

1. Application to exposed pulp tissue is difficult when using calcium hydroxide in powder form.

2. Calcium hydroxide powder exerts a repelling action on the cement base material which interferes with the placing of the base.

3. When placing the cement base, loose calcium hydroxide powder is apt to be forced into the pulp, creating undesirable pressure.

4. If bleeding or seepage from the pulp occurs, the calcium hydroxide ordinarily employed as described above, frequently becomes dislodged.

Simplified Method—It seemed desirable to incorporate calcium hydroxide in a suitable vehicle which would have no inhibitor effect on its basic chemical properties and which would overcome the disadvantages enumerated.

An aqueous solution of methyl cellulose was found to be the most desirable. Calcium hydroxide-methyl cellulose paste simplifies the method of application for pulp protection because it is (1) smooth in texture, tenacious, cohesive and adhesive, (2) when placed in contact with pulp tissue and tooth structure it does not become dislodged from its position, and (3) this paste will not repel cement when a base is indicated.

Experimental Studies

Six dog's teeth were mechanically exposed and capped with a calcium hydroxide-methyl cellulose paste.* After two and one-half months the teeth were extracted and histologic sections prepared.

Healing Results—The sections showed that healing of the pulp occurred in all of the teeth, together with the formation of new odontoblasts and a covering of dentin.

Pulpotomies Successful—Calcium hydroxide-methyl cellulose paste has been used clinically on 120 cases of pulp capping and pulpotomy over a period of one year. All pulpotomies were successful by clinical and roentgenologic observations. Three cases involving pulp capping failed, possibly due to the condition of the pulp prior to treatment.

Use Under Silicate Restorations—Cavities were prepared in six dog's teeth, lined with calcium hydroxide-methyl cellulose paste and filled with silicate cement. Two and one-half months later the teeth were extracted and sectioned for histologic study. All sections showed no evidence of pulp pathosis as is found when silicate cement is placed in a freshly cut tooth.

Summary

The favorable results observed by other investigators when calcium hydroxide was used for pulp capping, pulpotomy, and cavity lining have been confirmed. On the basis of this study, pulp capping is recommended only if there is reasonable assurance that the pulp is healthy. If the condition of the pulp is questionable, pulpotomy is the preferred technique.

Adapted from *Journal of Dentistry for Children* **27**:65-68 (Fourth Quarter) 1950.

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*Pulpdent®.

Use of a Magnetic Board in PATIENT EDUCATION

JACK FEDER, D.D.S., Irvington, N.J.

DIGEST

Much time in the dental office is necessarily spent in educating patients and as visual education is more valuable than discussion, the author of this article developed a method of showing patients how teeth function rather than giving them a detailed explanation which was often confusing.

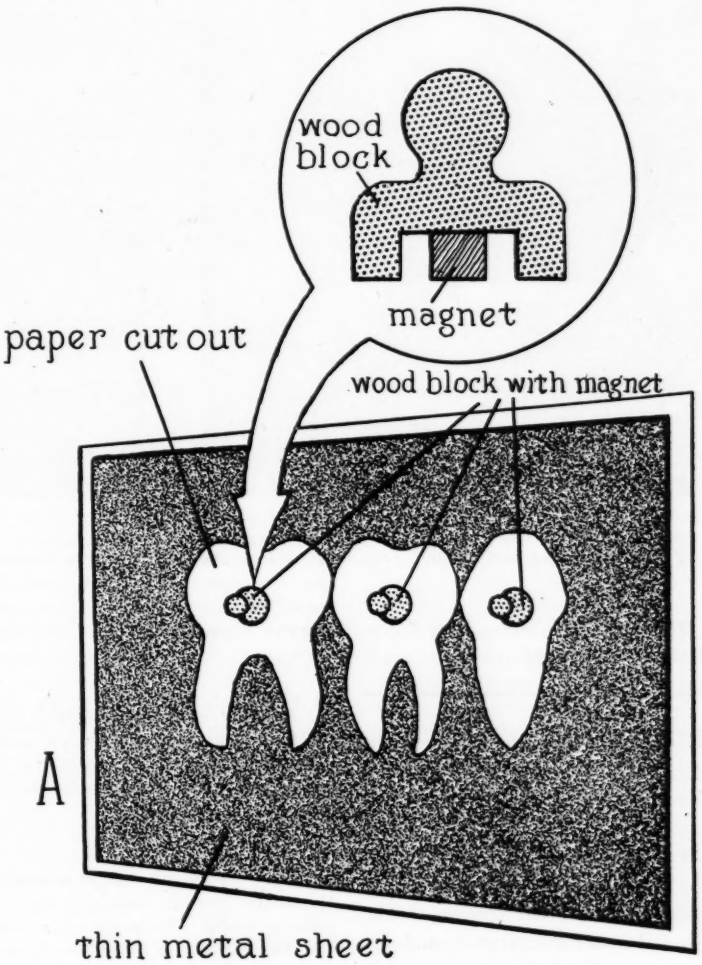
A magnetic bulletin board which can be purchased in a department store has been utilized with notable success by the author who finds the appliance not only helpful in patient education but also in clinics and for other educational purposes.

Description

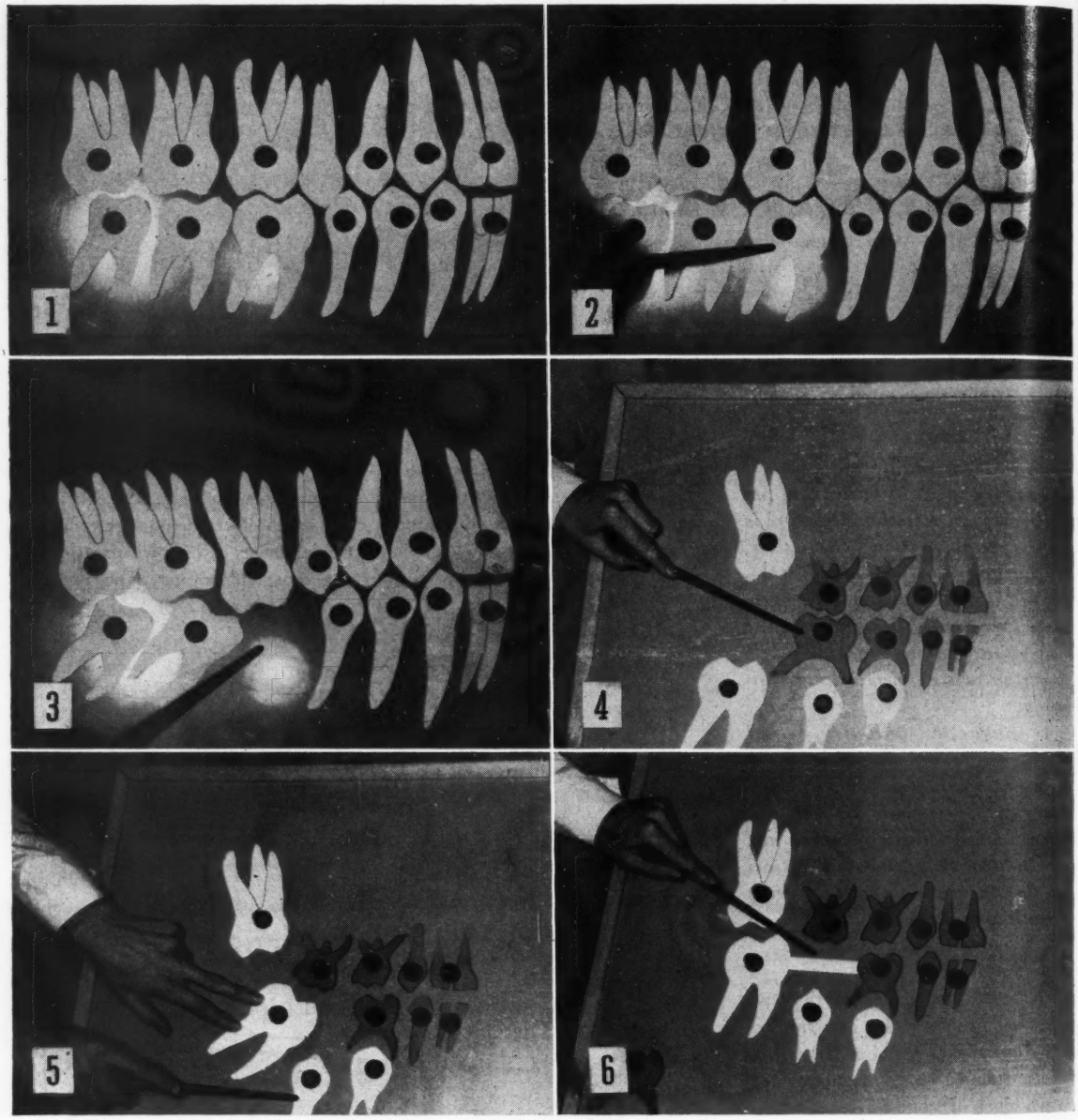
A magnetic bulletin board of the type sold in department stores is composed of a thin sheet of metal encased in a wooden frame. Small magnets, each set in a block of wood for ease in handling are furnished with each board (Fig. A). A sheet of paper placed between the magnet and the metal board will be held in place by the pull of the magnet to the board.

Movement of Teeth Shown—By cutting out the paper in the shape of a tooth and using several of these teeth, a method is evolved of showing patients pictorially the movement of teeth. The magnet and the paper tooth are moved together on the metal board. The black circles on the photographs (Figs. 1-12) show the magnet in position.

Use of Colored Papers—By using various colored papers (1) the difference between the permanent and deciduous teeth, (2) a bite plane, or (3) some other appliance can be cut out and its use shown. The dentist can use ingenuity to demonstrate the particular facets of his own practice that are most interesting. The board is



A. *Small magnets, each set in a block of wood, for ease in handling, are furnished with each board. A sheet of paper placed between the magnet and the metal board will be kept in place by the pull of the magnet to the board.*



1. ***Teeth set in normal centric relation (schematic).***

2. ***The lower first molar is to be extracted (see pointer).***

3. ***When the molar is not replaced, the remaining teeth tilt, and food packs into open interproximal spaces causing gingival irritation and dental caries.***

4. ***Use of contrasting colored paper teeth to differentiate between permanent and deciduous dentitions. The lower deciduous second molar is to be extracted.***

5. ***The lower first molar is moved into the space recently occupied by a deciduous molar. The patient can readily see that there is no room for the lower second bicuspid to erupt.***

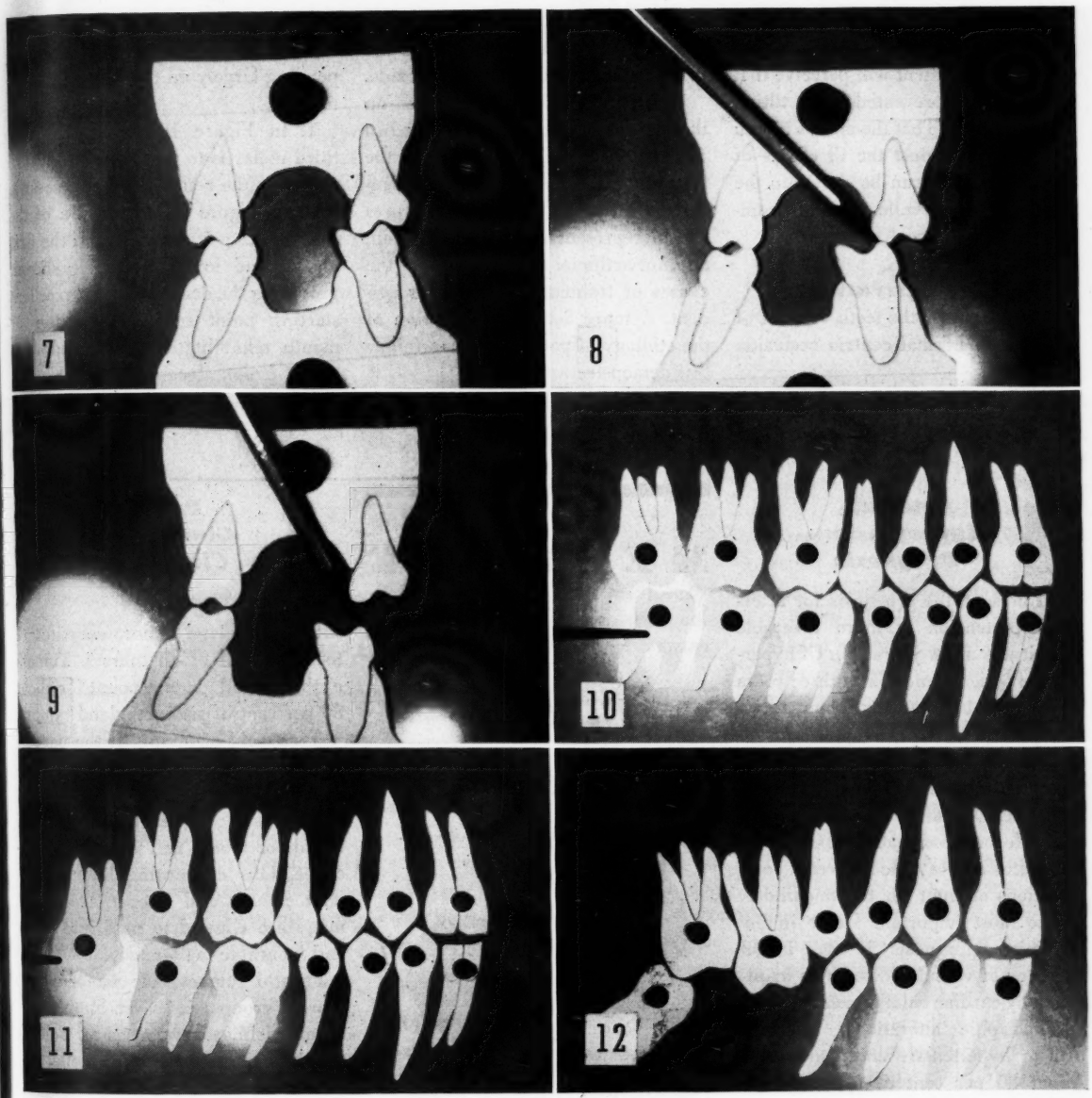
6. ***The pointer shows a space maintainer used to preserve space for a lower second bicuspid. Occlusion now develops normally.***

helpful in the education of patients and is ideal for presenting clinics and other educational demonstrations.

Advantages

1. The board can be kept in an upright position for easy viewing. 2. The teeth and board are large enough for demonstration either before a class or to a patient. 3. The teeth can be moved readily in any direction so that the movement of teeth can be displayed during verbal explanation. 4. The board is easily transported from place to place.

Additional Uses—On the patient level the board (1) affords a readily understandable method of demon-



7. *Cross section (schematic) of either normal dentition or dentures, showing teeth in normal centric occlusion.*

8. *The teeth on the left are in working relation and are in balancing relation on the right (see pointer).*

9. *Working relation is shown on the left and* no *balance on the right. Normal teeth would be under trauma and periodontal involvement would follow. Artificial dentures would tip and rock.*

10. *The lower third molar is to be extracted (see pointer).*

11. *The upper third molar has drifted downward into space recently occupied by the lower third molar. The upper molar will soon have to be extracted because it is traumatizing lower gingival tissue.*

12. *The lower first and second molars have been missing for some time. The teeth have tilted and moved resulting in loss of vertical dimension. Occlusal reconstruction is now necessary.*

strating to the patient exactly what a normal occlusion looks like (Fig. 1), (2) what happens when a tooth is lost and not replaced, (3) closure of the space, (4) the elongation of the first upper molar and the tilting of the remaining lower molars, and the resultant traumatic occlusion and its attendant sequelae (Fig. 3).

Consequences of Loss of Teeth Shown—1. The result of the loss of a deciduous tooth, for instance the lower right first deciduous molar, can be visualized ((Figs. 4, and 5). 2. By moving the lower permanent molar into the space recently occupied by the second deciduous molar the harmful effects that will follow if a space

maintainer is not used can easily be shown. If a space maintainer is used (Fig. 6) the patient will perceive that the teeth are prevented from tilting and moving. 3. That the child's mouth is protected against the ill effects of the loss of teeth can be shown to the parents of the juvenile patient by comparing Figure 5 and Figure 6.

Visual Demonstrations

1. In Figure 7 the teeth of a set of dentures in normal centric occlusion are shown.

2. In Figure 8 the teeth on the left side are in working relation and are in balancing relation on the right side.

3. Figure 9 shows no balance on the right side. From this can be shown (1) that if there is no contact of the teeth in the balancing relation dentures will tip, or (2) if these dentures are to represent a normal dentition, and not artificial dentures, one of the causes of traumatic occlusion is evident. A more detailed description of the etiology of periodontia can follow this demonstration.

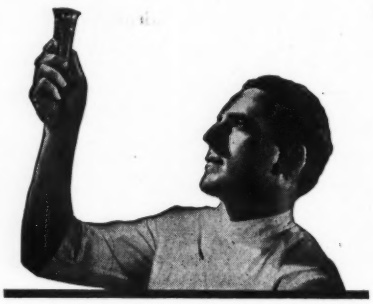
The uses of the magnetic board are almost unlimited, the applications depending largely on the dentist's originality:

1. In Figure 10 the lower right third molar is to be extracted. Figure 11 shows the result of this procedure.

2. In Figure 12 the closure of the bite resulting from the loss of the first and second lower molars is shown, providing the dentist with an excellent starting point for a discussion of mouth rehabilitation or periodontia.

372 *Union Avenue.*

MEDICINE *and the Biologic Sciences*



Arterial Hypertension—Prognosis

At present, the prognosis for arterial hypertension is more favorable than it was a few years ago. Of hypertensive patients under fifty-three years of age it is believed that about forty-five per cent die of complications of hypertensive disease within a nine-year period after the initial examination. Cerebrovascular accidents account for approximately one-half of the deaths and cardiac and renal complications account for the remainder.

The most important factor in determining prognosis is the initial presence of vascular disease as manifested by cardiac enlargement, electrocardiographic alterations, albuminuria or hypertensive encephalopathy. About 80 per cent of patients with such complications die much sooner than those without such complications.

The factors of (1) the height of the blood pressure, (2) the sex of the patient (mortality rate is higher in males), and (3) the degree of retinopathy, are of secondary importance. The age of the patient and the duration of the hypertension have little, if any effect on the outcome.

It is generally impossible to predict the type of death from the findings at the initial examination. Most patients show evidence of slow progression. However, many are without serious or disabling symptoms. The benign course of the disease in many patients without vascular complications is quite common.

Blood pressure shows little tendency to change. Many persons withstand severe hypertension for many years. In dealing with hypertensive patients it is important to determine the degree and progression of vascular change and damage in heart, brain, kidney, and retina.

Griep, Arthur H.; Barry, George R.; Hall, Winston, C.; and Hoobler, Sibley W.: The Prognosis in Arterial Hypertension, Am. J. M. Sc. **221**: 239-249 (*March*) 1951.

Parotid Gland Tumors—Classification

Salivary gland tumors constitute 1 to 2 per cent of all tumors. Tumors of the parotid gland account for about 80 per cent of salivary gland tumors.

Treatment of tumors of the parotid gland has in many instances been inadequate. Neoplasms of this gland may remain completely curable for a decade or more. Yet, because of misconceptions concerning their malignant nature and proper treatment, many are allowed to pass into gross and incurable malignancy.

Parotid tumors may be classified into six groups: (1) Cyst. Simple cyst is rare. It may develop as a result of atresia, obstruction, or congenital defects in the ducts. The unsubstantiated diagnosis of "cyst" is a dangerous one, as malignant tumor may present cystic degeneration.

(2) Adenoma. The adenoma occurring rarely in the parotid is encapsulated, grows slowly, and mimics the parent gland in microscopic appearance. The safe time to make the diagnosis of adenoma is after complete removal of the tumor.

(3) Adenocarcinoma. Simple or papillary adenocarcinoma accounts for less than 10 per cent of parotid tumors. The microscopic appearance may be well differentiated and innocent but the ultimate fate of the patient with adenocarcinoma is suffi-

(*Continued on page* 177)

OCCLUSAL REHABILITATION

in Practice

MURRAY N. RUBINSTEIN, D.D.S., New York

DIGEST

The case report included in this article deals with the classification of patients who have experienced excessive occlusal wear with marked diminution of the clinical crown. The resultant loss of vertical dimension in the case selected for discussion was the cause of prolonged occipital pain for several years.

Step-by-step directions for the procedure followed in the correction of this case are presented.

Progress Made in Procedural Study

Extended study of the subject of occlusal rehabilitation has greatly increased the dentist's knowledge of the technique. Through the restoration of occlusal harmony dental longevity can be achieved for many patients who previously have had only the choice of becoming edentulous.

Classification of Cases Requiring Occlusal Rehabilitation

Schwartz[1] has classified cases requiring occlusal rehabilitation in the following groups:

1. Where all or most of the teeth are present but severely abraded occlusally with or without attendant trauma.

2. Loss of a number of teeth with various lengths of edentulous spans and where no replacements have been made for a long time, resulting in exfoliation of the teeth opposite the edentulous area.

3. Where extreme overbites with fanning anteriors are present, frequently resulting in gingival inflammation.

4. Cases requiring upper and lower partial restorations with complete loss of articulatory relationship due to tooth migration.

5. Prognathism of greater or lesser extent brought on by loss of teeth and abrasion of the anterior teeth incisally, resulting in a lingual articulation of the upper anteriors.

6. Restoration of the lower posterior teeth with the upper posteriors extruded or exfoliated to a point of contact with the lower ridges.

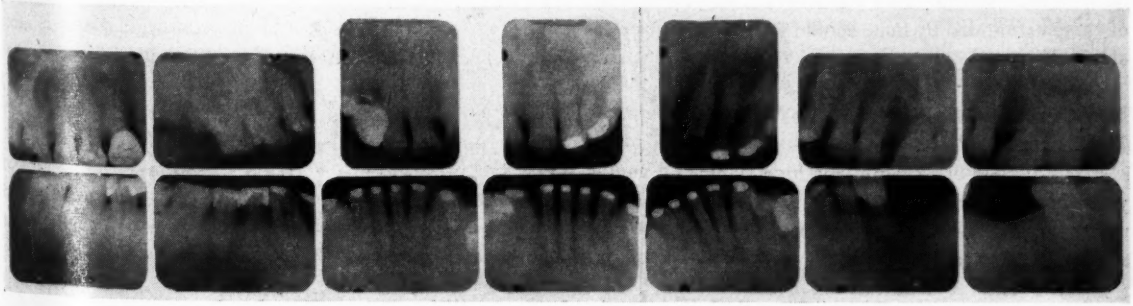
7. Where displacement of the condyle head has occurred.

There are many other variations but the categorical description listed is in general descriptive of the prevailing difficulties encountered.

Primary Factors in Mouth Rehabilitation

Any consideration of restoration in mouth rehabilitation has as its primary factor the reestablishment of occlusal harmony integrated with principles consistent with function. The ultimate aim should be to rebuild the dentition to an equilibrated occlusion where maximum tooth contact in any of the mandibular positions may be obtained in function. The masticatory load being reduced on individual teeth (1) improved physiologic tone, and (2) general dental health may be anticipated.

1. *X-rays.*



[1]Schwartz, J. R.: Occlusion: Classification of Cases Requiring Rehabilitation, N. Y. J. Dent. 16:142-144 (April) 1946.

Basic Rules for Determining Correction

In treatment planning the observations of many practitioners suggest the following basic rules in determining correction:

1. Vertical dimension increase should generally be avoided. Unless there are symptoms of temporomandibular disorders it is necessary to restore the damaged teeth to the previous level. This is especially true for older patients. It is advisable to have as an objective a reconstructive level consistent with the age of the patient.

2. The buccolingual diameter of all rebuilt teeth should be kept to a minimum. This will tend to reduce conversely the stress of mastication by confining the load in a line with the long axes of the teeth where it can be most satisfactorily borne. As previously stated, it is necessary to secure lateral balance in eccentric positions of the mandible for the maximum distribution of stress.

Obtaining Maximum Distribution of Stress

To obtain maximum distribution of stress the following factors should be borne in mind:

(a) Retention of the rest position.

(b) Harmony of inclined planes which will reduce eccentric occlusal stresses.

(c) Maximum distribution of stress in centric relation.

(d) Reduction of inclines of guiding tooth surfaces so that occlusal stresses may be more favorably applied to the supporting tissues.

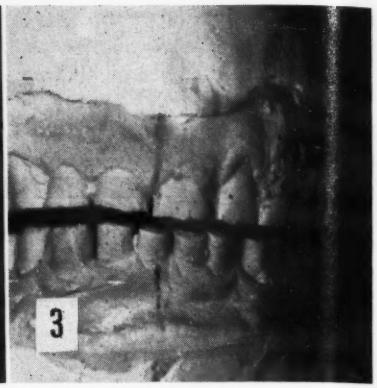
(e) Retention of tooth anatomy to secure sharper cutting cusps and good sluiceways.

(f) The requirement of biomechanics that the clinical crown should be definitely shorter than the length of root surrounded by bone should be observed.

Demonstration of Treatment Planning

A case under observation for four years is presented to illustrate treatment planning. The male patient, now aged 70, is in excellent health.

History—For several years it had been noted that the teeth were abrading. There were no abnormal habits and no correction was attempted earlier on the advice of a periodontist as there was no destructive evidence in the periodontal tissues and the teeth were in fairly balanced occlusion.



2. ***Preoperative view of patient.***

3. ***Study models mounted, showing degree of opening determined arbitrarily.***

Corrective Measures—Recently the loss of tooth structure made it necessary to institute corrective measures to prevent a complete collapse of the dentition. In addition, the patient complained of occipital pain, particularly after meals.

Method of Treatment

The following steps were taken in the management of the case:

1. A complete series of x-rays, including bitewings, were taken. Note that the bone is fairly dense with the trabeculae favorable. The only unfavorable tooth is the upper right first molar. The distal pocket involves the trifurcation. It was decided to remove this tooth. The general clinical picture was satisfactory.

2. The patient was photographed.

3. Study models were made from alginate impressions. Duplicate models were poured from original impressions for comparison of correction between the two sets. Note that there is a displacement of the mandible to the left. Compare this with the correct alinement in the completed case. Models were articulated and after preliminary tests it was decided to open vertical dimension 3½ millimeters which was a minimum considering the amount of structure lost.

No Correction Necessary—Opening vertical dimension was an arbitrary decision but inasmuch as metal trial cast splints were to be made correction could be achieved if necessary, depending on the patient's response. In this case no correction was necessary as the patient experienced marked improvement from the moment of insertion.

The increase in vertical dimension was distributed between both upper and lower dentitions.

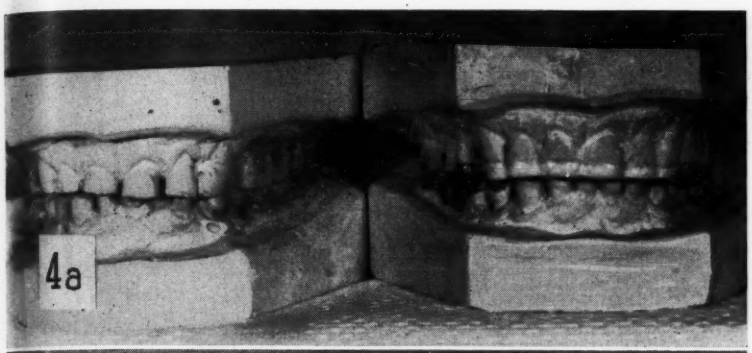
Laboratory Procedure—1. Lower posteriors were built up in wax to a height of approximately 1½ millimeters. This was roughly corrected with the template to a curve plane that appeared ideal for the case.

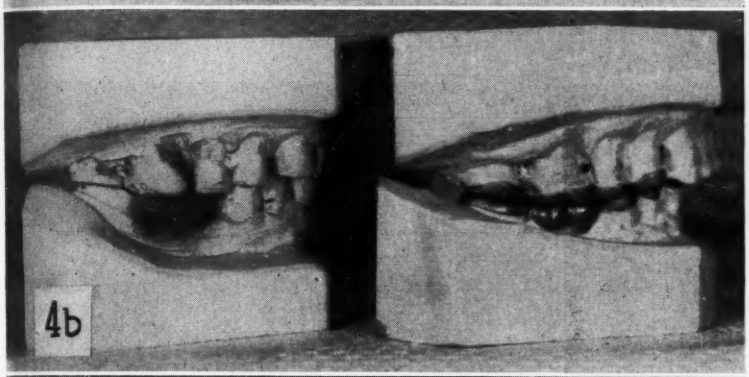
2. The Seides[2] system of securing cuspal inclination was used. This is an ingenious method and is of great help (1) in determining cusp height, and (2) facilitating proper carving.

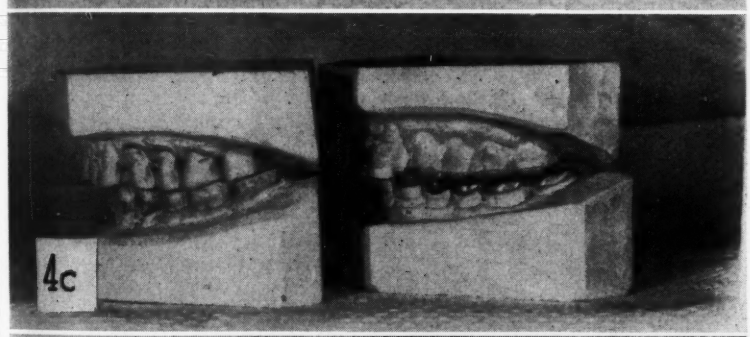
Determining Cusp Height—The technique designed by Seides includes the following steps:

1. After determining the height of the occlusal plane of the lower, add wax to secure this height and fashion

[2]Seides, H.: Factors of Occlusion in Relation to Mouth Rehabilitation, J.A.D.A. 30:241-248 (February) 1943.







4A. *Comparison of study models before and after trial splints were made.* **4B.** *Right lateral projection.* **4C.** *Left lateral projection.* **4D.** *Occlusal view.*

roughly with template curve to the desired position.

2. To establish cusp height, two strips of metal are trimmed to approximate the curvature of the lower occlusal wax rim and set on edge along a line representing the central groove of the lower posterior teeth. Tack to the rim with sticky wax.

3. The upper edges of the metal strip are engaged in plaster to the upper articulator bow.

Use of Articulator Bow—The "runners" described represent the relative position of the palatal cusp points in relation to the lower central grooves. By moving the upper bow of the articulator from side to side the buccal and lingual cusp inclines are established. By moving the bow anteroposteriorly the anteroposterior curvature or compensating curve is checked for exactitude.

Agreement of Condylar and Incisal Guidances—The movements of the bow must harmonize with the patient's condylar guidance and the established incisal guidances. These inclines should provide a maximum contact with the metal runner in lateral and anteroposterior movements of the machine. When this step has been completed the occlusal anatomy is carved into the wax and the splints are ready for casting.

Splints are Cast—When the lower splints are cast, fitted, and polished the upper splints are waxed up to articulate with them. After casting, the upper splints are spot ground and polished. The four splints are now ready for their insertion in the mouth. These splints are set with temporary cement.

Relationships Harmonize — The cusp relationships of the splints harmonize with each other. They also harmonize with the recorded condylar movements of the patient as these condylar movements are influenced by the established cusp guidances. The cusp inclines bear a harmonious relationship to each other and to the incisal guidance and condylar guidance.

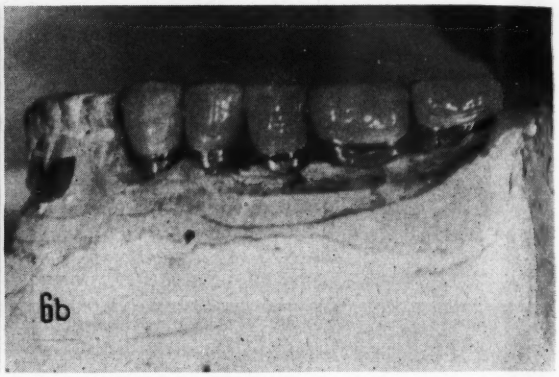
Additional Steps

1. Lower splints were cast and polished.

2. The upper model was replaced on the articulator and a complete one-piece upper splint embracing all the teeth was carved to complement the case at a predetermined opening. Provision in the splint was made for an acrylic insert for the six anterior teeth to mask off the gold incisal.

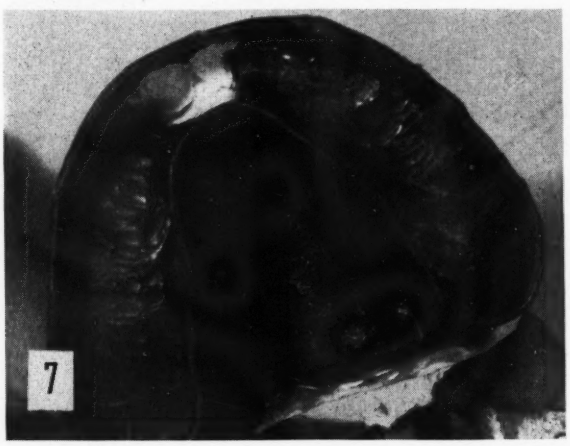
3. All splints, lower and upper, were cemented in place with temporary cement for a period of approximately six weeks to ascertain the patient's reaction. Patient response was excellent and no correction was necessary.

5. ***Trial splints cemented.***



6A. ***View of lower left dies with gold foil swaged to receive wax-up of veneer crowns.***

6B. ***Finished veneer crowns.***



7. ***Chew-in bite to establish occlusal plane for upper posterior jackets. Boxed and ready for pouring.***

Treatment for Permanent Correction—1. The lower right quadrant was corrected first. With the left splint in position, in one visit, acrylic veneer crown preparations were made for the molar and the two bicuspids.

2. Band impressions were taken in compound with a rebasing technique using graphite wax.

3. An alginate impression and bite were taken for an acrylic splint in one of the new fast self-curing plastics.

4. After correction for bite, the acrylic splint was temporarily cemented with zinc oxide paste.

5. Band impressions were copper plated and transfer copings were made for the master impression.

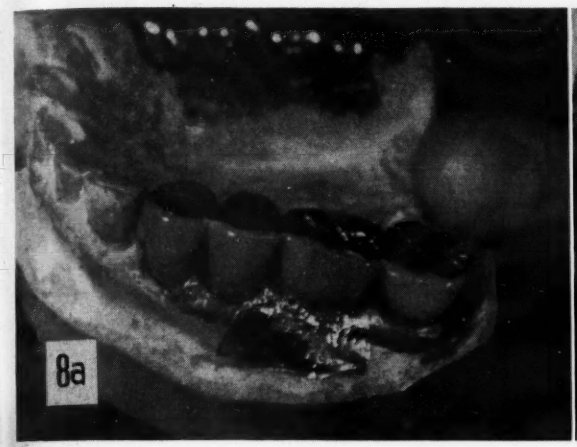
6. At the next visit, after seating copings, full maxillary and mandibular impressions in plaster were taken. The upper was poured in metal for durability; the lower in stone. The bite was taken and the case was mounted. Crowns were waxed on dies.

(A technique that will facilitate waxing the crowns on dies is the following: Swage 24-carat fine gold foil to the die, leaving a slight overextension of foil. This will make it easier to handle the wax-up in succeeding steps.)

7. Place crowns on teeth and check for occlusion and contact. Take the bite and full lower plaster impression.

8. Wax the pontics, balance to case and cast. They are then polished and soldered to crowns. The assemblage is tried in the mouth; if correct, the bridge is replaced on the model and waxed up for acrylic attachment. The case is processed, polished, and then temporarily cemented in the mouth.

Correction for the Lower Left Quadrant—1. The two molars and the two bicuspids were prepared for veneer crowns and as with the right side, band impressions were taken.



2. A full alginate impression was taken for the construction of a temporary acrylic splint. The use of the self-curing plastic makes it possible to keep the patient comfortable immediately and for as long as necessary until the crowns are completed.

3. The crowns were waxed to balance, cast, and polished. They were then tried in the mouth for contact points; occlusion was checked.

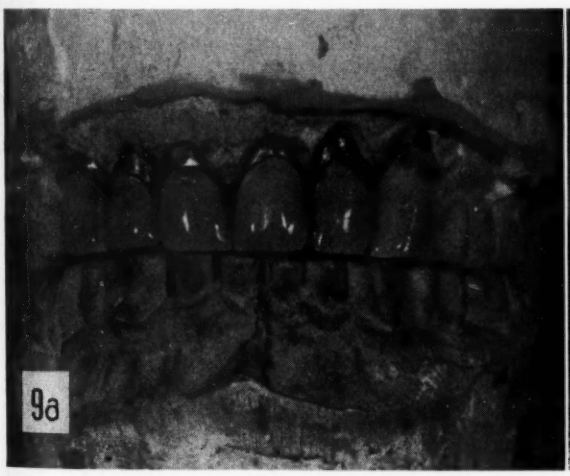
4. The veneer crowns were waxed. After processing, the crowns were temporarily set in the mouth with zinc oxide paste.

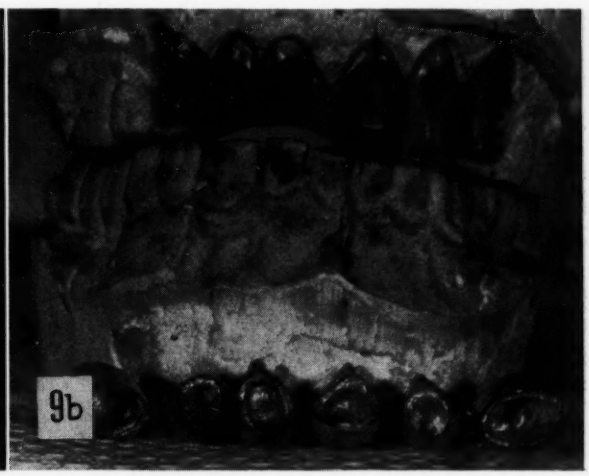
8A. *Finished veneer crowns. Upper right.*

8B. *Finished veneer crowns. Upper left.*

9A. *Crowns on model.*

9B. *Upper anterior dies and interior view of cast acrylic veneer crowns.*





Treatment of the Upper Jaw

1. In order to maintain the vertical dimension created by the temporary gold splint, the patient must wear this splint during treatment. The splint was cut through the mesial to the upper right first bicuspid. The upper right quadrant was then prepared for veneer crowns. As previously described, band impressions and the bite were taken. An immediate acrylic splint was made for temporary use.

2. The cast splint was removed from the left side and the teeth of the left quadrant were prepared for ve-

10. *Postoperative view of the case two years after completion.*

neer crowns. A temporary acrylic splint was made as before.

3. After transfers were made from copper-plated dies, a master impression was taken in plaster. An alginate impression was taken of the lower jaw for counter.

4. It was decided to use a functional chew-in bite technique for the fabrication of the upper case. Using the temporary splints as a guide, the articulator was set at the opening previously determined. Splints were then removed and a bite-block was built to this opening, using shellac base and compound at the tooth area. For a stop, the remaining anterior of the original cast splint was cemented to the teeth. The bite-block was placed in the mouth and a functional bite was taken.

5. The bite-block was then placed on the upper model and an anterior stop was provided by cutting out an area in the region of the centrals. The articulator was set to this definite stop, the bite was boxed in and poured to the lower platform.

6. Crowns were now waxed, cast, polished, and tried in the mouth.

7. An impression was taken for a bridge on the upper right side. The bridge was fabricated and all crowns were veneered and stained in acrylic. Upon completion the appliance was placed in the mouth with temporary cement.

Preparation for Upper Anterior Teeth—1. The teeth were prepared for veneer crowns, using full circumferential shoulders. This step was decided on because these teeth were severely abraded and extremely short.

2. Band impressions and a full alginate impression for an immediate acrylic splint were taken. The splint was made of self-curing plastic and inserted before dismissing the patient.

3. Transfers were made on copper-plated dies.

4. At the next visit a master impression was taken in plaster. Models were again mounted with the aid of the full bite.

Aid in Registering Bite—As an aid for the bite register the author has devised a simple method of using a supporting frame to hold the bite wax properly. Shape a piece of fairly rigid wire by bending it to the curve of the dental arch. For greater strength, loop the wire at the central region. Place half a sheet of wax under the frame and cover the frame with another half sheet of wax. Cut the outside corners and provide lingual cut-out to facilitate placement of bite wax.

Comments

1. It should be noted that from the beginning of treatment provisions were made to keep the patient comfortable. The patient, who at no time suffered discomfort, was enthusiastic at the progress of treatment.

2. There has been no return of the occipital pain experienced before the start of treatment.

3. It is reasonable to assume that the reconstruction described will afford extended service because of the technique using full coverage in gold for strength with acrylic veneers which because of proper staining are acceptable esthetically.

4. This case was completed in 1947 and is now being reported after sufficient testing for durability.

200 *Central Park South.*

Announcement of Books Received

DOCTOR'S AND DENTIST'S TAX HANDBOOK, by Paul Gitlin, New York, Prentice-Hall, Inc., 1951. Price $4.95.

INLAYS ET ONLAYS BRIDGES SUR DENTS VIVANTES, by R. Le Huche, Paris, Julien Prelat, Editeur, 1951. Price Fr. 1.6660.

ODONTO-STOMATOLOGIE, Vol. III, by Gottlieb Vest, D.D.S., Basel, Switzerland, E. Birkhauser & Cie, 1951. Price Fr. 36.

DENTAL LABORATORY TECHNIQUE, Edited by W. A. Warrington, London, Associated Dental Technicians, 1951.

DIE RATIONALISIERTE APEKTOMIE, by G. Sargenti, D.M.D., Bern, Switzerland, Hans Huber, 1951.

TRAITEMENT ORTHOPEDIQUE ET PROTHETIQUE DES LESIONS DE MACHOIRES PENDANT LA GUERRE DE FINLANDE 1941-1944, by G. W. Hildebrand, Stockholm, P. A. Norstedt & Sons, 1951. Price 30.-Sw. Crowns.

THEORIE UND PRAXIS DER PARTIELLEN PROTHESE, by Josef Vachuda, and Rudolf Lenk, Vienna, Verlag Wilhelm Maudrich, 1951. Price $16.80.

THE PHOTOGRAPHY OF PATIENTS, by H. Lou Gibson, F.B.P.A., A.P.S.A., Springfield, Illinois, Charles C. Thomas • Publisher, 1952, Price $5.50.

PAIN AND ITS PROBLEMS, by Sir Heneage Ogilvie, K.B.D., D.M., M.Ch., F.R.C.S., and William A. R. Thomson, M.D., Philadelphia, The Blakiston Company, 1951. Price $3.00.

THE MERCK INDEX OF CHEMICALS AND DRUGS, Sixth Edition, Rahway, N.J., Merck & Co., Inc., 1952. Price $7.50.

The EDITOR'S Page

DENTISTS ARE supposed to be almost exclusively interested in mechanical procedures for the removal of diseased dental tissues and for the replacement of such tissues by various forms of dental restorations. Dental society program chairmen have been conditioned to think that unless a program was devoted to oral surgery, operative, or prosthetic dentistry that attendance would be slim and unappreciative. Whoever dared to present a program based on the biologic sciences or on some of the less popular aspects of clinical practice such as roentgenology, orthodontics, pedodontics, endodontics, periodontics risked censure from the boastfully styled "bread and butter" dentists.

There is substantial evidence to indicate that dentists are concerned with more basic issues than mechanics. By way of cataloguing: dentists are more interested in applied nutrition than are physicians. One can search the current medical literature each month and seldom come upon an article on nutrition. The nation-wide seminars on dental medicine show that dentists are willing to take the better part of a week from their offices and spend several hundred dollars to learn about fundamental biologic subjects. None of these seminars has found it necessary to offer programs in "practical" dentistry to stimulate attendance or to pander to interest. Dentists are concerned with public health as shown by the vigor of the debate on the subject of fluoridation. Dentists are concerned with research as shown by their interest in the use of the antibiotics in clinical practice, in caries control by chemical methods, in the use of radioisotopes in investigation.

Another piece of evidence to show that dentists are expanding their fields of interest is the phenomenal attention that they are giving to psychologic subjects. At the recent Midwinter meeting of the Chicago Dental Society a program entitled *What the Dentist Should Know About Himself* was presented to a standing-room-only audience. The session lasted for more than two hours and was devoted to psychologic principles as interpreted by a psychologist, a psychiatrist, and a practicing dentist. This attention to subjects of human motivation and behavior is a corollary to the current interest being shown by physicians on the clinical aspects of psychodynamics, psychobiology, and psychosomatic medicine. We are finally beginning to see the clinical implications that man responds to stress by a multitude of reactions that involve his bodily structures, his feeling tone, his thought patterns, and his action forms. Stress in the form of disease or its treatment is an event that concerns a total human being. No two human beings are alike and therefore no two react to the event in the same way. We can save ourselves many moments of frustration by remembering this fact and we can prevent many occasions of anxiety for our patients by putting this fact into clinical use.

A fine example of the expanding emphasis in medicine on psychologic subjects is the statement by John C. Whitehorn of Johns Hopkins:[1]

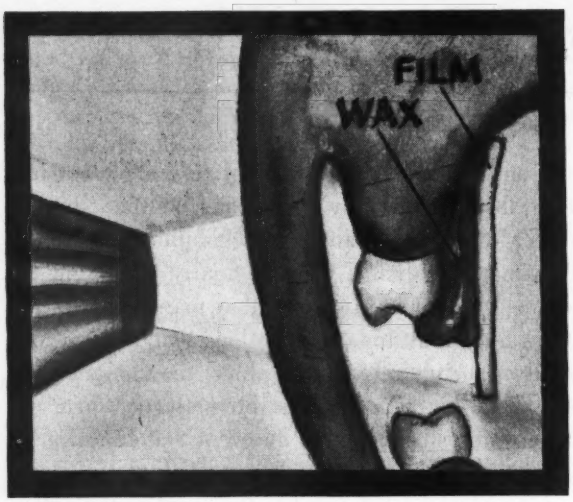
"Medical practice has been greatly changed by major triumphs over infectious disease through bacteriological study, sanitary engineering, chemotherapy, and the antibiotic drugs. The span of life has been lengthened. Chronic disease and marginal conditions of persistent ill health now demand a larger share of medical attention and require from the physician greater understanding and skill in dealing with human nature. In the necessary task of aiding individual patients to adapt to stress, to modify their ways of living, and especially to resolve more effectively the internal emotional conflicts that spoil life for so many unfortunate persons, the modern physician needs something that traditional medical education and training have not provided.

"Psychiatry has found some answers and has developed some methods of studying human nature that offer possibilities for physicians to work out better solutions to some of these problems.

"Modern medicine has become a fearfully complicated procedure, depending, however, in the ultimate analysis on the trained good sense of the individual practitioners, and limited by their limitations."

The same is true in dental practice.

[1]Whitehorn, John C.: Basic Psychiatry in Medical Practice, J.A.M.A. **148**:329-334 (Feb. 2) 1952.



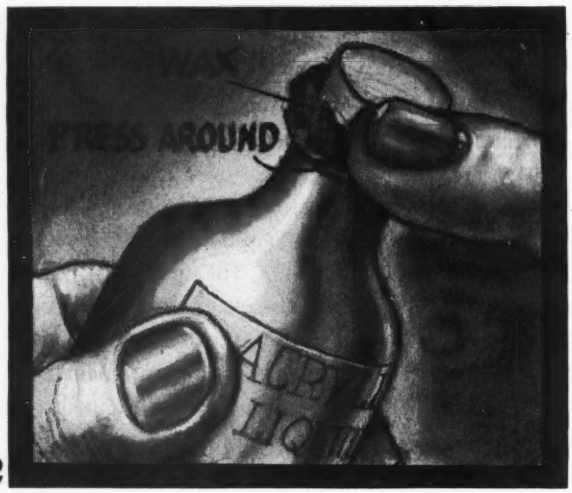
1

Clinical and Laborator

A Film Positioner

Murray M. Kotick, D.D.S., New York

1. In the right-angle x-ray technique where the film is placed parallel to the long axis of the tooth, the film may be held in correct position by a wedge of soft baseplate or beeswax.

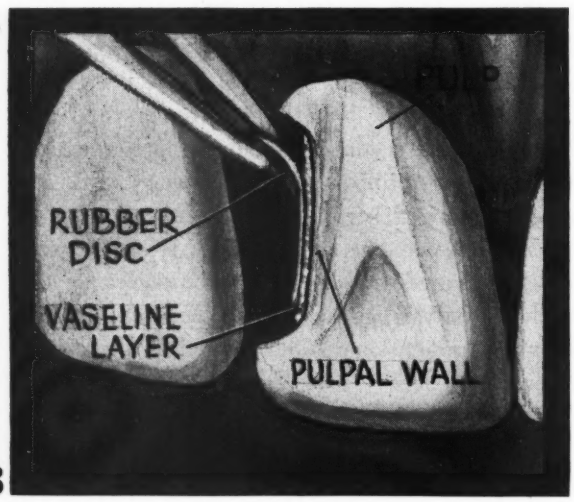


2

Preventing the Evaporation of Acrylic Liquid

Leo J. Ripp, D.D.S., Omaha, Neb.

2. After the bottle seal has been broken, adapt utility wax around the cap. This wax may be readapted with finger pressure each time after the liquid has been used.



3

A Method of Pulp Protection

H. J. Turkheim, D.M.D., London, England

3. An anti-acid and temperature insulating lining for a deep cavity may be created by adapting a rubber dam or a wax paper disc to fit the area in close proximity to the pulp. Vaseline is placed in the cavity and the insulating disc is adapted with a pair of tweezers. Cement is flowed over the protective disc.

READERS *are Urged to Collect* $10.00

For every practical clinical or laboratory suggestion that is usable, DENTAL DIGEST will pay $10.00 on publication.

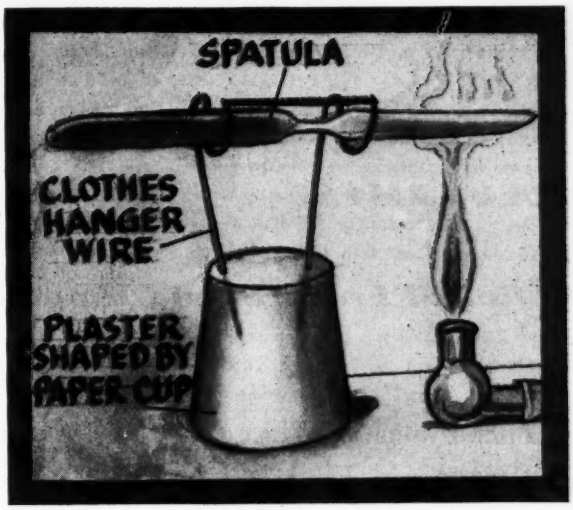
You do not have to write an article. Furnish us with rough drawings or sketches, from which we will make suitable illustrations; write a brief description of the

SUGGESTIONS . . .

A Spatula Holder

John S. Gawey, D.D.S., Tulsa, Okla.

4. Bend a wire clothes hanger as shown in the sketch. Fill a paper drinking cup with plaster and embed the wire into the plaster. When the plaster has hardened, remove the paper cup.

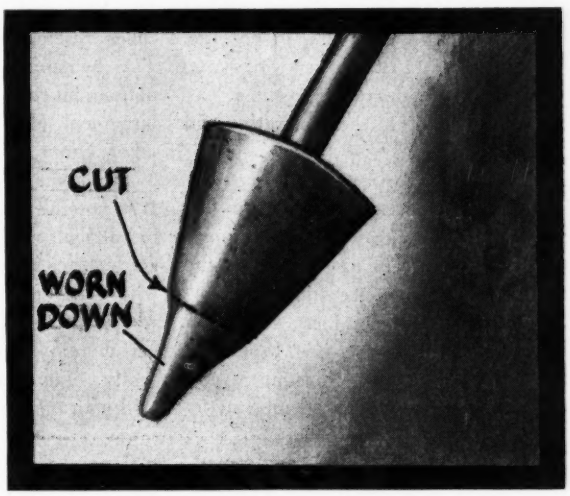


4

Salvaging Diamond Points

Irving H. Goldstein, D.D.S., Atlanta, Ga.

5. To salvage a diamond stone that is worn on the end, cut off the worn part with a disc. The part that remains has many uses in cavity preparation.

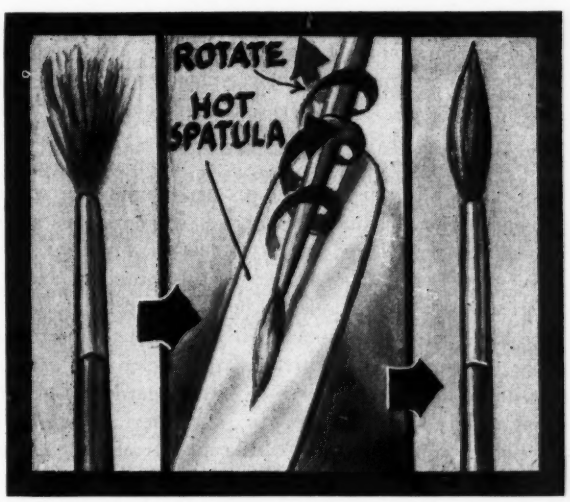


5

Needle Pointing Sable Brushes

Chester J. Henschel, D.D.S., Mahopac, N.Y.

6. In the nonpressure self-curing acrylic technique a needle point sable brush is desirable. Heat a metal plaster spatula over a flame until a wet cotton pellet will produce sizzling. Dip the splayed sable brush in water several times and each time draw it along the hot spatula, rotating the brush as it is drawn. The spatula should be hot enough to cause sizzling but not hot enough to burn the brush. The brush is easily steamed and pressed to produce a sharp point.



6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 186 for a convenient form to use.

Send your ideas to: Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

LEUKEMIA:

Clinical Features and Diagnosis

SIR LIONEL WHITBY, M.D., F.R.C.P., Cambridge, England

Types of Leukemia

From the aspects of diagnosis, prognosis, and treatment the leukemias are best classified on a simple clinical basis as acute, subacute, or chronic, according to (1) the urgency of symptoms, (2) the degree of toxemia, (3) the fever, and (4) the prostration and exhaustion.

Academic Aspect—From the academic or hematologic aspect the disease can be divided into many types. The precursors of each or all of the leucocytes which are found in normal blood may dominate the blood picture and so give rise to named types such as myeloblastic, myelocytic, lymphoblastic, lymphocytic, monoblastic, and monocytic.

Atypical Forms—Numerous atypical forms also occur, for example, eosinophilic leukemia, while allied diseases such as lymphosarcoma provide categories of their own. From the general aspect the main features of these anomalous types are most easily comprehended by their symptomatology.

Clinical Features

Leukemia is a disease with protean manifestation. Numerous other diseases may be imitated and symptoms may present in any system or in any part of the body. This is because of the basic pathology whereby the mobile leukemic cells infiltrate all the tissues of the body and, in some sites, may undergo proliferation.

Variety of Symptoms—A leukemic patient may present with (1) neurologic lesions, (2) Ménières syndrome, (3) dermatologic manifestations, (4) dental lesions, (5) visual changes, (6) bone and joint symptoms sometimes resembling acute rheumatism, (7) hematuria, (8) purpura, (9) abdominal tumor, (10) glandular enlargement, (11) bronchitis, and many other symptoms.

Symptoms Bearing on Diagnosis—It is possible, however, to select from the difficult medley of symptoms salient features which bring the diagnosis within the realm of possibility and which justify an examination of the peripheral blood, if not the unequivocally diagnostic operation associated with the examination of the marrow.

General Symptoms—The symptoms which are most commonly present arise from (1) the gradually increasing anemia, an outstanding feature of the disease, or (2) the enlargement of the spleen or glands.

Any complaint of increasing lassitude, fatigue, distaste for work, lack of energy, inability to concentrate and in advanced cases, a shortness of breath are all worthy of a blood examination whether or not the spleen and glands are enlarged.

Frequent Signs—Lesser degrees of gingivitis and stomatitis found in the chronic forms of leukemia are perhaps the signs most worthy of suspicion but are most frequently disregarded. Too often the patient is referred to a dental surgeon for local treatment; especially when the manifestation is no more than a painful swelling of the gum around one tooth, usually a molar or bicuspid, suggesting a rather diffuse infection requiring treatment by extraction.

Lesions of the Mouth Merit Investigation—After extraction the socket does not heal, the patient gets worse and is eventually discovered to be a case of leukemia. This insidious presentation with localized gingival swelling is most common with the monocytic type of the disease which is not very amenable to treatment. From this knowledge it is demonstrated that any inflammatory, ulcerative, or necrotic lesion of the mouth, pharynx, or gingival tissue is worthy of investigation by a blood examination.

Chronic Types

Most cases of chronic leukemia present mainly some symptom arising from the accompanying anemia which is usually associated with splenic and glandular enlargement. Gingivitis, stomatitis, or pharyngitis are also common.

The Acute Disease

Often the final compelling features in a patient in the full tide of his powers have been preceded for weeks or months by a feeling of increasing weakness, lassitude, fatigue, and depression. The sudden appearance of purpura, fever, toxemia, and stomatitis should be sufficient warning that this is the final phase of an inevitably fatal disease, the nature of which can be readily established by a competent blood examination.

Symptoms in Youth

Any persistent, unexplained, and

intractable anemia, especially in childhood and adolescence, should lead to a suspicion of leukemia. The suspicion should not be dismissed until one, or more than one, marrow sample has ruled the diagnosis out. In youth the disease may closely imitate acute rheumatism with fever and toxemia associated with swollen and painful joints caused by leukemic infiltration.

Chronic Types in the Elderly

In the aged the clinical picture may be singularly symptomless even with grossly enlarged glands and spleen. Chronic types of leukemia in the elderly and aged often persist for years, with or without treatment, and the subject may die of some other disease without ever exhibiting any of the progressive or dangerous symptoms of leukemia itself.

Uncommon Forms

These include chloroma, in which the local tumor arises beneath the periosteum of the bones, especially of the skull and thorax, and Mikulicz's syndrome of bilateral enlargement of the salivary and lacrimal glands.

Nature of the Disease

Leukemia is placed among the malignant neoplasms of lymphatic and hemopoietic tissues. This probably provides the best answer to the laity in the present state of knowledge of the disease.

There is no evidence whatever that the disease is infectious. The intravenous injection of leukemic blood in human patients has not carried the disease and all attempts to transmit it to lower animals by blood or by tissue have failed. There have been rare cases of leukemia in families, but the evidence for a direct transference of the disease in the human subject is not nearly strong enough to exclude coincidence.

Studies in Infants and Mothers—Further evidence against the infectious nature of leukemia is found in the studies of the disease in infants and mothers: a leukemic mother gives birth to healthy children and no infant developing leukemia in the first few months of life has been found to have leukemic parents.

Contributing Hazards—Overexposure or injudicious exposure, or even exposure intermittently over long periods of time, to x-rays or irradiation, the very means which in graded and calculated doses, are used in an attempt to control the disease, seems to contribute to the incidence of the disease.

Leukemia is many times more common in physicians who practice radiology than in their colleagues.

Prognosis

Leukemia is inevitably fatal with the methods of treatment so far available, nor does available treatment appear to prolong life to any appreciable extent.

Palliative Measures—Much can be done, however, to improve efficiency and to relieve distressing symptoms, and to abandon all forms of treatment because the disease is incurable is not to be considered.

Duration of Life—Once the diagnosis is made the most difficult problem is to estimate the duration of life: (1) Patients with acute, subacute, or chronic types may be expected to live for weeks, months, and years respectively. (2) A case which is acute from the outset, with the exception of children, rarely lives for more than a few weeks and does not usually enjoy a remission, whereas the subacute case is more likely to do so. (3) The average chronic case of myeloid leukemia lives for two to three years, but it is most unwise to promise this time, since it is not often known exactly how long the disease has been in existence and the intrusion of an unpredictable exacerbation can upset all estimates. (4) An old person with chronic lymphatic leukemia may live for ten or more years, with or without treatment, and frequently dies of some other disease. (5) Pregnancy aggravates the leukemia process; spontaneous abortion, likely to be followed by a fatal hemorrhage, is common.

Differential Diagnosis

1. Most of the long list of conditions which have a superficial resemblance can be confidently disposed of by a marrow examination, for it is in the marrow that the leukemic process invariably starts, and it is there that it has usually existed for months or longer before it is clinically revealed.

2. The taking a sample from the marrow should always be entrusted to an expert hematologist.

3. A competent hematologist should have no real difficulty in differentiating the peculiar cells of glandular fever from true leukemia, even though the Paul-Bunnell reaction is negative.

4. In the clinical aspect, even the severest forms of glandular fever (including the anginose type with extensive and suggestive oral lesions) are unaccompanied by significant anemia. This is also true of Vincent's infection of the gums and pharynx, when gingivitis may raise the suspicion of leukemia.

5. The most difficult leukamoid diseases, especially with regard to blood changes, are the conditions which give rise to so-called leuco-erythroblastic anemia, a term which does not designate a specific disease, but denotes an anemia, which may be quite slight, associated with the presence of nucleated red cells and a few primitive leucocytes in the blood, and arising from a disturbance of the marrow due usually to a neoplasm in bone, or to a secondary neoplastic deposit commonly seen when the primary growth is in the prostate, ovary, breast, or thyroid.

6. A similar suspicious blood picture arises with the uncommon idiopathic myelosclerotic and osteosclerotic conditions. In these conditions the spleen is also greatly enlarged, giving both clinical and hematological resemblance to leukemia.

Adapted from *British Medical Journal* No. **4746**:1513-1515 (December 22) 1951.

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(*Continued from page* 164)

cient evidence of the treacherous nature of this tumor. These tumors tend to be poorly demarcated and infiltrating. As a rule, the growth is more rapid than that of other parotid tumors. For this reason patients usually seek treatment earlier.

(4) Mixed tumors. Approximately 75 per cent of parotid tumors are so-called mixed tumors. They are not confined to the salivary glands. They also occur in the lacrimal glands, the nares, the tonsils, and the lips. The typical site of origin in the parotid is in a comparatively circumscribed area just above and in front of the angle of the mandible.

Mixed tumors usually appear in patients from twenty to forty years of age. They grow slowly and may reach a diameter of 10 centimeters. They are usually round but sometimes lobulated. Microscopically the tumors are made up of three components: complexes of epithelial cells in cords or ductile structures, connective tissue of the mucoid type and a substance identified as cartilage or pseudocartilage. The genealogy of these tumors is uncertain. There is a pronounced tendency toward recurrence following removal of these tumors.

(5) Entodermal Cyst. This rare and benign tumor is a small mass of lymphoid tissue more closely resembling that of the tonsil than that of the salivary gland.

(6) Tumors of nonglandular origin. A variety of tumors arising from the blood vessels, the facial nerve, lymphoid tissue, and fibrous tissue of the capsule of the gland. Preoperative clinical diagnosis of this group of lesions is usually not made.

McNealy, Raymond W., and McCallister, John W.: Parotid Tumors and their Surgical Management, J. Michigan M. Soc. **50**:398-401 (*April*) 1951.

Oral Administration of Cortisone

Some clinicians have found that the oral use of cortisone suspension in syrup is a desirable method of admin-

In your ORAL HYGIENE this month

DEATH and TAXES

Death and taxes—we can't escape them . . . but we *can* scale inheritance taxes down a bit if we are willing to give them serious study while we're accumulating the estate that will eventually be taxed. When a dentist has worked hard to provide for his family during his lifetime and after his death, it is sad to see their security jeopardized by inheritance tax levies. We hope that every dentist with dependents will read Doctor John Appleman's fine article.

★ ★ ★

You know from experience how difficult it is to explain to some patients the need for certain treatment or restorations. Doctor Leo B. Dillon has solved his patient-education problems very simply by using the right kind of "samples"—study models, illustrations, charts, and other devices. He discusses his experience in the article, "Use and Abuse of Samples in the Dental Office." This article has won the monthly "best feature" award.

★ ★ ★

Back in November, Doctor Harold Gluck's article, "The Dentist and His Personality," gave readers a personality chart against which they might check their virtues and vices . . . Now along comes Doctor Robert Nemoff, saying that such a chart isn't an adequate nor accurate balance sheet. He contends that man is not a consistent creature as the chart might indicate, but a complex mental mechanism that reacts quite differently in different situations. Whether you agree with Doctor Gluck or with Doctor Nemoff, we think you'll find their discussion interesting.

★ ★ ★

And, speaking of Doctor Gluck, here he is—just over the page from Doctor Nemoff—but his article, this month, is on a different subject, "Visual Possibilities in Dentistry." He suggests that educational films can be well worth the trouble and expense of making them, that they are an exceedingly valuable adjunct in explaining proposed treatment or procedure to patients.

★ ★ ★

"Why Dentists Do . . . and Don't . . . Attend Meetings"—If you're a program chairman, you've probably done a lot of thinking about this subject, and you can probably add to this interesting analysis of dentists' excuses or reasons for not attending meetings more regularly. Doctor David Tabak's conclusion is that dentists as a group are more conscientious than many other organized groups in supporting their societies by attendance at meetings.

★ ★ ★

"Dentistry and Civilian Defense" describes the need for vast medical emergency preparation—and the part dentists may take in such a program. Doctor Russell W. Bunting writes the article. He is the consultant on dentistry, Division of Health and Special Weapons Defense, Federal Civil Defense Administration.

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istration unless contraindications to oral medication exist. The injectable suspension of cortisone has a highly disagreeable taste. However, this taste can be adequately disguised with one of the standard vehicles, such as syrup of cherry or orange.

The desired quantity of cortisone suspension is added to a measured volume of vehicle. The proportions are adjusted so that each cubic centimeter of the mixture contains 1 to 2 milligrams of cortisone. It is possible to dispense a week's supply of the drug without noting any variation in potency of the drug from one dose to the next.

The uniformity of clinical response indicates that the cortisone suspension in syrup retains its effectiveness for at least a week. It is necessary to shake the bottle vigorously before each use because cortisone has a tendency to settle out of suspension.

With oral administration, a large priming dose is not necessary at the initiation of therapy because an oral dose of cortisone in suspension is rapidly absorbed. The cortisone must be taken orally three or four times daily during the waking hours because the effect of an oral dose of cortisone is dissipated more rapidly than that of an equivalent intramuscular dose. It has not been found necessary for the patient to take a dose during the night.

The minimal effective dose varies widely for different patients and must be determined by trial. In general, the majority of patients have been adequately maintained on 75 to 100 milligrams of cortisone daily.

The minimal effective oral dose of cortisone may be slightly larger than the intramuscular dose, but the disadvantages of a larger maintenance dose may be offset by the significant advantages of oral administration.

When cortisone is taken orally the effect is prompt and of short duration, whereas the action of a dose given intramuscularly is slow to appear and may last for a number of days. The fact that oral administration of cortisone usually produces a therapeutic effect within a few hours is of obvious advantage in the treatment of acute disease. The brief action of an oral dose permits prompt termination of the effect of cortisone should dangerous reactions occur.

There is no reason to believe that the hazards of cortisone therapy are reduced by use of the oral route of administration. There appears to be no difference in the therapeutic effect between the use of cortisone tablets and the use of cortisone in syrup.

For some clinicians the oral use of cortisone suspension in syrup has become the method of choice for administration. The advantages are appreciated both by the patient and by the practitioner.

Engleman, Ephraim; Krupp, Marcus A.; and Kunkel, Peter: The Oral Use of Cortisone Suspension in Syrup, J.A.M.A. **145**:402-403 (*February* 10) 1951.

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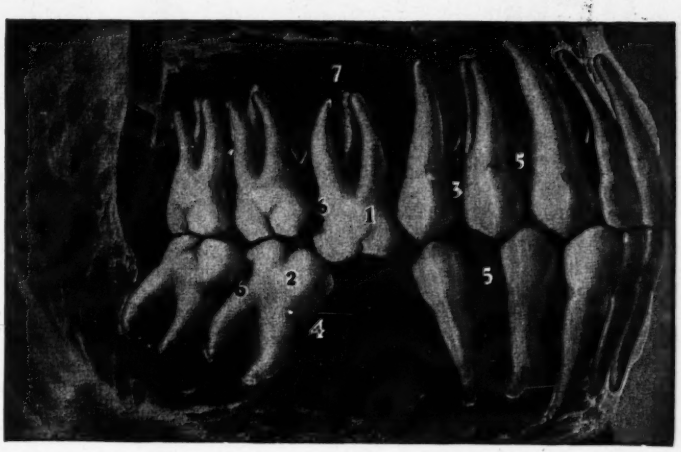

Part of Chart 4, showing the patient what happens when a tooth is not replaced.

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Here are brief descriptions of not all but some of them:

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Chart 2—Development and Eruption of Teeth: Seven color illustrations carry the process from age 2 through age 12.

Chart 3—The Progress of Tooth Decay: Three large full-color illustrations show a small cavity starting in the enamel and carry through to the final result: general systemic disease.

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Chart 5—How Irregularities of the Teeth Affect the Face: Another full-color chart which quickly makes clear to parents the perils inherent in neglecting needed orthodontic treatment.

Chart 6—Modern Porcelain Restorations: Four full-color illustrations which patients can comprehend almost at a glance—making clear the advantages, and saving time you might otherwise be forced to use in presenting your recommendations.

Chart 7—The Expense of Poor Dentistry: Eight full-color illustrations make clear, even to an uneducated patient, the folly of cheap dentistry.

Chart 8—The Development of Root-End Infections: Four large full-color illustrations present facts that patients would otherwise not comprehend, and would accordingly neglect treatment.

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Contra-Angles

The Myth of the Indispensable Man

One of our recent Presidents created the myth of the man the world could not do without. Where two terms in office were considered enough for other Presidents, this man increased the number by 100 per cent and placed himself in office for four terms. By a wise constitutional amendment this arrogance can never be repeated after the present occupant of the White House is retired. At this time that gentleman is making sounds that suggest he wishes to have another chance at the substantial tax-free income of that office. These are not his words. *His* are that he will offer himself for the job for the cause of world peace and domestic prosperity. No laughing, please!

The myth of indispensability has filtered down from the White House to envelop people in lesser jobs. Even dentists have absorbed some of this spirit. There are our colleagues who feel that unless they are on hand in their office six days a week fifty weeks a year their patients cannot be served adequately. They are slaves to the demands of the public. They "clean" teeth whenever a patient orders them to do so. They encourage folks to "drop in any time" for treatment. If the patient says that 7 A.M. or 7 P.M. are the only times that he can come for an appointment the dentist replies "that is perfectly all right with me."

How did dentists get this way? There are several reasons: financial insecurity, avarice, a well-developed sense of obligation. These are understandable reasons. We cannot, however, ignore the myth of the indispensable man that is also part of the picture. Ego emphasis makes us all want to think that we are unique, irreplaceable jewels, treasures unlike any

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When a dentist suffers from this ego expansiveness, he likes to think that only he, and he alone, could serve his patients properly. He knows them and they love him. Haven't some of them told him that they just wouldn't know what to do if he wasn't there to care for them? He smiled sweetly and modestly said that there are probably other dentists just as good who could carry their cares of dental treatment. But inside himself he felt pretty sure that these other dentists wouldn't do quite as well by the patient. He, the ego happy dentist, often wondered what would happen to these people after he was gone. That some of them might be better served by another dentist never distressed his thoughts.

There are many dear and elegantly satisfying relationships that are built up over the years between a dentist and his patients. These warm and understanding relationships are one of the rich rewards of the profession. Not for a moment would I deprecate them. I have seen my share of undisciplined brats who came to me with their deciduous problems, then grow to a fine adulthood; some with distinguished military records, some with substantial accomplishments in home-making. I have carried many adolescents through the evil days of rampant caries and the frequently associated acne and gangling legs. These burgeoning kids in one of the most insecure periods of life were required to spend long and unpleasant hours in dental treatment, and to listen the while to my shrill harangues against candy and cokes, and to my recitation of the virtues of a bit more tooth brushing. Many of them, I am sure, hated me because I was in their eyes an old fossil, and because I inflicted pain and my opinions upon them. After these hard years I still see dozens of them in my office, now grown to man's estate and womanly responsibility, many of them entrusting *their* children to my care. Every dentist has had the same rewarding experience.

A dentist would be subhuman if he did not find pleasure in the trust that people place in him, trust that often extends over ten, twenty, thirty, and sometimes fifty years. I am proud of the patients who have not lost faith with me after twenty-five years and only a little less proud of some of the restorations that are still giving service after a quarter century. But from these pleasant emotions I have no reason to draw even a private conclusion that I am their indispensable dentist. For more than twenty-five years there have been hundreds of patients who did not return and a good many restorations that were not satisfactory. What happened to these people and what went wrong with some of these treatments? It is a little easier for me to answer the second part of the question than it is to answer the first part.

My treatments and procedures that failed, and there are many, failed because of poor diagnosis. I do not mean failure to discover a cavity in a tooth or to diagnose disease of the pulp or of the supporting tissues. I have made these errors, too. My chief ignoble counts are the following: ignorance of the nature of disease, ignorance of stresses and torques, ignorance of the relationship between dental disease and systemic conditions.

On occasions I have created beautifully contoured and artfully carved restorations that failed miserably and quickly. I have placed other restora-

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Long, P. H.: Oral Surg., Oral M., and Oral Path. 762 (June) 1951.

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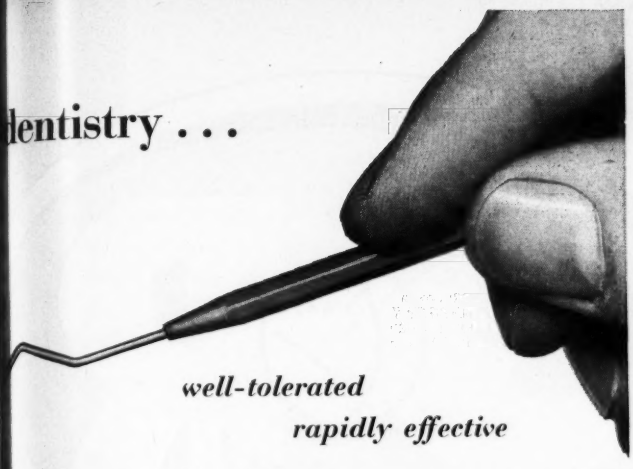

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tions that violated dental preconceptions—they were flat and faulty—but that served well and comfortably for years. Now and then I have seen a vulcanite denture that according to the modern dental mathematicians and seers, violates every principle of physics, engineering, astronomy, and astrology. Even so, the wearers of these dentures often tell me that they eat well, that they are comfortable, and that no one has complained about their appearance. In a few such cases, with crass selling (or case presentation, according to the more sensitive dental management experts) I have made new dentures for these trusting people. Within the limits of my ability I have boxed the compass and adorned their patient heads with fearsome gadgets to perform the rituals that are the mysteries of the act of chewing. Within a hair's breadth I have recorded the apex of the gothic arch and have worried myself to prostration over the Munson curve and in later days over the anti-Munson curve. When the dentures were finished they were prettier, much prettier, than the old vulcanite ones. There was only one thing wrong—they didn't work as well as the old ones. I log these failures and most others to poor diagnosis which is a fancy way of saying that I didn't see the total patient and that I concentrated so much on little things that I forgot the large ones. A common failing among all of us, I am sure.

But the human relationships that I fumbled are more difficult to understand. My record cards (and yours) are depressing dossiers on these failures. Hundreds of people have sat in my dental chair (and yours) never to return. Some may have returned once or twice and some were treated for several years. In only a few cases that I recall, was there any overt unpleasantness between the patient and me. They did not tell *me* that I was incompetent, a robber, or a boor. So far as I remember, I thought that I treated most of them with consideration, fairness, and reasonable skill. Unhappily for me, their thoughts ran to the contrary.

As another evidence of man's dispensability, I offer the case of the dentist who retires from practice or dies. He, too, had patients who told him that he could never be replaced as their dentist. In a short time you and I find these people coming to us. Sometimes they come in a spirit of doubt and suspicion, usually in good grace. The affection and confidence that they retain for their former dentist is a beautiful sentiment. It is something that we should never mar under any condition. We should cultivate this rare flower wherever we find it because affection and trust are not too common in our world. The fact to remember is that we or some other dentist can give as good, and sometimes better, service than the dentist who went before. The same is true for the dentist who takes over our patients. There is no indispensable dentist, only a personality that can not be replaced.

When, in those moments as they come to all men, I have thoughts of my own indispensability, I think of the hundreds of patients who never shared those thoughts with me. In fact, they dispensed with me quickly and conclusively. Naturally, I also think of those dear people who have expressed qualms of the plight that will befall them when I am no longer able or present to care for them. I like the sentiment, but I know it isn't true. It is only when you begin be-

lieving these pretty things that you are in danger. Romanticize over such sentiments all you like but keep such thoughts on the phantasy level. Like to think that you are indispensable but know that you are not. If Mr. Roosevelt, after two terms, had listened to the voice of reason rather than to the siren of ego, the world and all mankind might have been better. —E. J. R.

Anesthesia with Pentothal Sodium-Nitrous Oxide and Muscle Relaxing Agents

A. H. KORNBLAU, M.D.;
A. C. GOLDFELDER, M.D.; and
M. P. ELKIND, M.D., New York

Technique

The technique used in an earlier series of cases was with a 2.5 per cent solution of pentothal sodium given intermittently through the side-arm of a three-way stopcock. Between intervals of pentothal administration an infusion of 5 per cent glucose in saline or 5 per cent glucose in water was given to maintain patency of the needle.

Present Method—It was found more convenient to use a 0.5 per cent pentothal solution, administered by drip through a disposable plastic intravenous "Stat" set.

Solution Bottles Readily Changed—When required, solution bottles can be readily changed, alternating the pentothal infusion with the plain glucose in saline or glucose in water infusion. When transfusion is needed, if another vein is not readily accessible, blood can be introduced by piercing the tubing close to the vein.

Amount of Anesthetic Used—Ordinarily 50 to 100 cubic centimeters (250 to 500 milligrams) is sufficient to induce smooth peaceful sleep within two to three minutes without any excitement phase. As soon as the eyelid reflex is abolished, administration of 50 to 80 per cent nitrous oxide with oxygen is begun. After another one to two minutes an attempt is made to pass an oropharyngeal airway, and if endotracheal intubation is contemplated, 5 per cent cocaine is sprayed into the oropharynx.

Time Required for Anesthesia—The entire induction and intubation usually requires about eight to twelve minutes and maintenance of anesthesia is continued with a slow drip of pentothal plus 50 to 75 per cent nitrous oxide by a semiclosed carbon dioxide absorption technique.

Intocostrin in 1 to 2 cubic centimeter (3 to 6 milligrams) doses, or syncurine in 1 to 2 cubic centimeter (1 milligram) doses is given intravenously at intervals as required. For intubation one of these drugs is used three to five minutes after induction with pentothal. Syncurine seems to be better than intocostrin or d-tubocurarine at this point because it causes the glottis to be open more widely and permits ease of endotracheal intubation.

Vigilance is Required—If pentothal is given too rapidly apnea frequently results. As long as the circulation is

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good transitory apnea causes little concern to the experienced anesthetist; after a short period of controlled respiration voluntary efforts of the patient are soon re-established. However, unintentional apnea should not be disregarded for the assumption that all is well while artificial ventilation is perfomed on an apneic patient has encouraged carelessness in the use of depressant drugs.

Vasopressor Agent Employed—Occasionally, if the systolic blood pressure falls below 100 millimeters Hg., or more than 40 millimeters Hg. below the preoperative level, a vasopressor drug is employed. Methedrine (desoxyephedrine) 4 milligrams (3 minims) is given simultaneously by intramuscular route to obtain a prolonged effect. Methedrine counteracts the depressent effect of pentothal and patients so treated present an improved clinical picture.

Analysis of Cases

The series of cases presented for analysis included 216 patients of all graded risks many of whom were in poor condition preoperatively. Of the patients 122 were male and 94 female. The youngest was 12 years of age, the oldest 88.

Types of Surgery—The operations included cholecystectomies, gastrectomies, and most of the types of operation encountered in a general hospital.

Time Length of Operation—The shortest operation lasted twenty-five minutes, the longest three hundred and thirty minutes, an average of ninety minutes.

Dosage—1. Usually 15 to 20 milligrams per minute of pentothal was used in cases lasting less than one hour. In longer operations it was attempted to limit the pentothal to 10 to 12 milligrams per minute. If more than this amount was used it was considered excessive.

2. In most cases 1 to 4 milligrams syncurine or 3 to 6 cubic centimeters (9 to 18 milligrams) of intocostrin were used.

3. In some cases 1 to 4 milligrams syncurine or 3 to 6 cubic centimeters (9 to 18 milligrams) of intocostrin.

4. In others syncurine was used during induction and for intubation. Where operation was protracted intocostrin was used during maintenance because of its prolonged action and syncurine again at the end, to avoid profound relaxation after closure.

Results of Analysis

1. In 69 patients (32 per cent) an endotracheal tube was used. In 23 cases the described technique was used for induction only; maintenance was continued by inhalation of cyclopropane or ether. Of the remaining, 153 cases were uneventful.

2. Ten patients died during the postoperative course but no deaths could be attributed directly to the anesthesia, even though this may have been a contributory cause. In most cases pathologic conditions found at operation were probably sufficient to cause death.

3. Almost all patients in the series

CLINICAL AND LABORATORY SUGGESTIONS
(*See pages* 172 *and* 173)

Form to be Used by Contributors

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Explanation of Procedure:

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who died during the postoperative course were generally in poor condition at the time of operation. It is felt that the possibility of hypoxia (cerebral and cardiac) is the greatest hazard for poor risk patients, and its occurrence to some degree is not always easily preventable.

4. In 6 cases other agents (cyclopropane or ether) were added during the operations. In 17 cases the described technique was used for induction only and anesthesia was maintained with other inhalation agents.

5. Apnea occurred in 8 cases unintentionally and lasted from five to twenty minutes. It is believed this was due to pentothal rather than curare. Pulmonary ventilation by manual pressure on the breathing bag was performed until return of spontaneous respiration.

6. In 14 cases postoperative pulmonary complications occurred. One patient who had preoperative auricular fibrillation and chronic thrombophlebitis suffered a pulmonary infarction on the fifth postoperative day. Four patients had pleural effusion; 5 patients had segmental atelectasis; pulmonary congestion and bronchopneumonia were the remaining pulmonary complications.

7. A drop in blood pressure of varying degree resulted in 16 cases. It is believed that this also was due to pentothal. Such occurrences were marked in hypertensive patients.

Disadvantages of the Technique

(1) *Hypotension*—Rapid administration of the pentothal solution will often produce hypotension which can be corrected by intravenous administration of a vasopressor.

(2) *Apnea*—Even though a relatively small amount of pentothal has been administered, some patients promptly become apneic. As long as an airtight system can be maintained it is not difficult to provide adequate pulmonary ventilation. This may require manual ventilation by closing the exhalation valve and discontinuing the nitrous oxide flow.

(3) *Inadequate Relaxation*—Despite what was considered adequate

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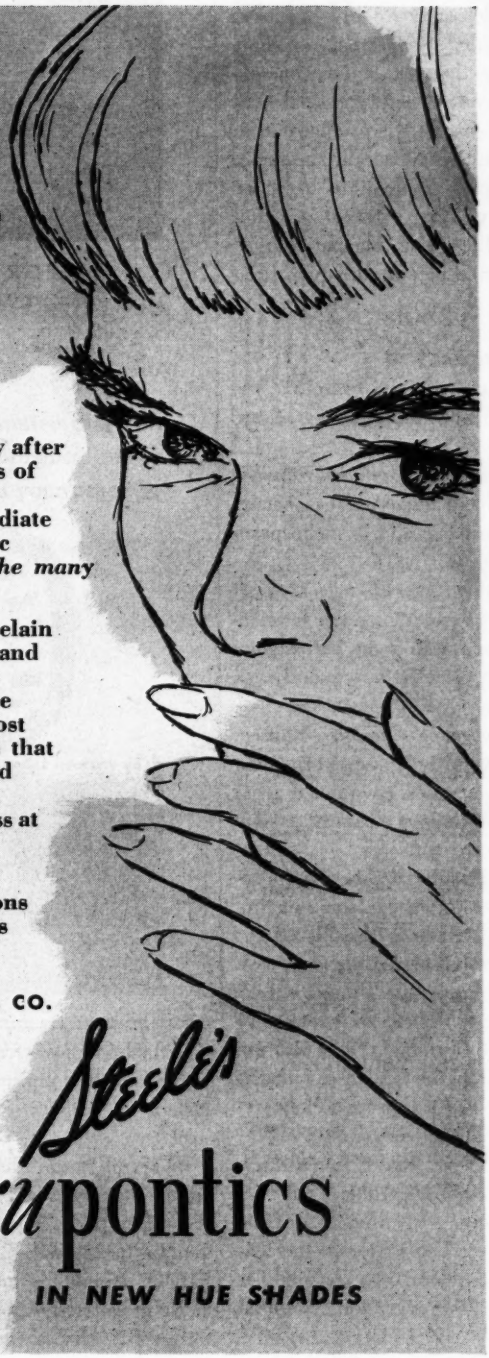

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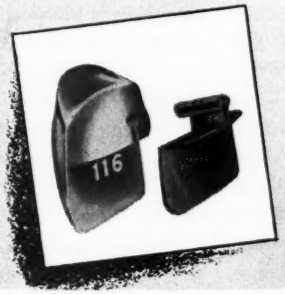

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administration of pentothal and curare, relaxation has at times been considered inadequate by the surgeon. In such cases it is better to change to another agent.

(4) *Undesirable Reflexes*—During administration of pentothal, occasionally a patient coughs, or for some obscure reason has a laryngospasm or bronchospasm. This is prone to occur if the patient is under light anesthesia and an attempt is made to insert an oral airway. Any external stimulus may cause the spasm. The patient may become cyanotic and the picture is alarming.

Advantages

Experience with the technique described indicates the following advantages:

(1) *Induction Smooth and Rapid*—The excitement stage seldom occurs and laryngospasm and bronchospasm are infrequent.

(2) *Excellent Psychic Effect*—During postoperative rounds the satisfaction and happiness of the patients are noted. Their friends subsequently ask for the same type of anesthesia.

(3) *Emergence Smooth*—Nausea, retching, vomiting, or excitement rarely accompanies emergence from anesthesia. This is a pleasant association for the patient.

(4) *Usefulness Where Cyclopropane is Unavailable*—In some institutions cyclopropane is considered too hazardous because of explosive possibilities. Cyclopropane should not be used in the presence of cautery or open electric equipment. It is also undesirable for patients with cardiac irregularities, or for those who have recently been digitalized.

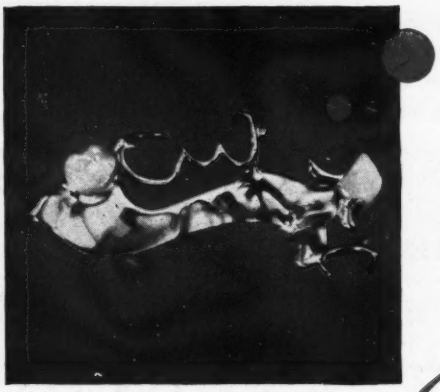
(5) *Usefulness Where Spinal Anesthesia May Be Undesirable*—Such instances include skin infections of the back, pathologic condition of the central nervous system, hypertension, or when there is an aversion to spinal anesthesia.

(6) *Where Profound Relaxation is Not Required*—In orthopedic measures, such as pinning of femurs, patients tolerate this method well. It has been used on elderly poor risk patients with no ill effects and rapid recoveries. The method allows free use of cautery or any electric equipment and is excellent in surgery of the head and neck.

(7) *Intubation Indicated*—It is believed that in any procedure within the upper part of the abdomen when general anesthesia is employed, all patients should be intubated (1) because the anesthesiologist is then master of the airway, and (2) because with a tube in the trachea relaxation is more easily obtained. With the endotracheal tube in place, virtually all the gas is delivered to the respiratory tract, and little is diverted to the gastrointestinal tract. Less anesthetic gas is used, the anesthesia is smoother, and there is less postoperative nausea, vomiting, or distention.

(8) *Suitability for Nervous Patients*—A great advantage of the method described is its suitability for nervous patients, pentothal being started at the bedside rather than in the operating room.

Adapted from *Current Researches in Anesthesia and Analgesia* **30**:325-335 (November-December) 1951.



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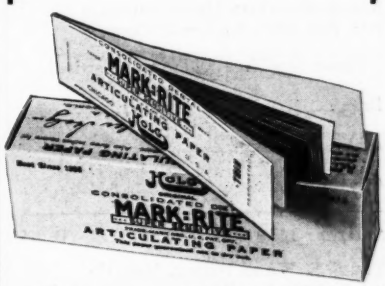

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senses.

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5. There is a much wider distribution of taste buds in the fetus, infant, and children than in the adult. Our sense of taste diminishes, therefore, as we grow older.

6. There is a gradual shift of taste from the tip of the tongue to the region of the circumvallate papillae. Our sense of taste of sweet and salt diminishes, and the sour is more pronounced.

7. Complete loss of taste, or ageusia, is known to accompany hysterical and other abnormal nervous states. It may be temporary, or, in cases of certain lesions, the sense of taste may be permanently destroyed.

8. The sense of taste may be interfered with or even interrupted by the interjection of an outside stimulus such as a denture or dentures.

9. Pressure or pain acting as a counterirritant may interrupt the sense of taste.

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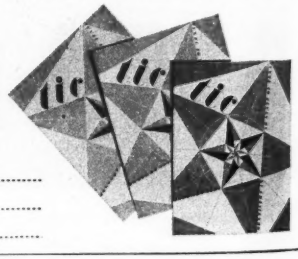

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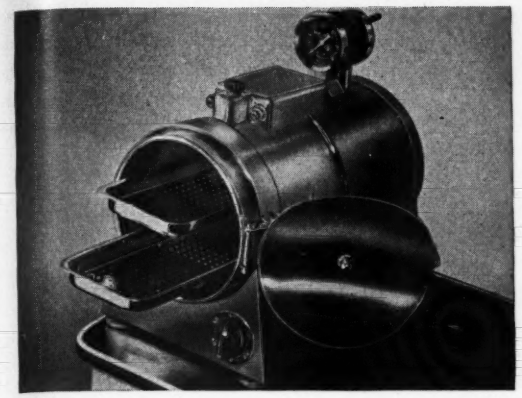

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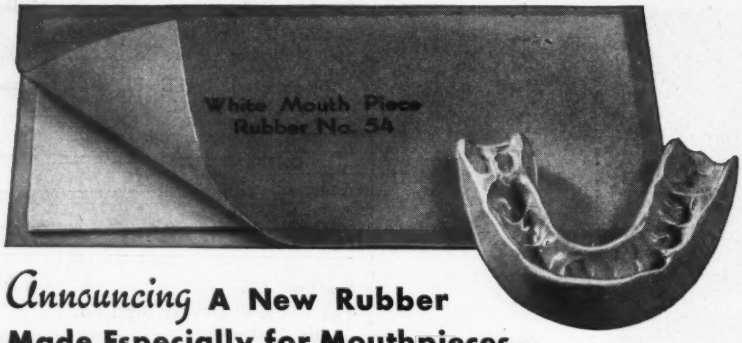

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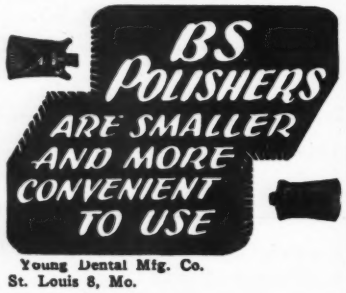

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tual covering of taste buds in the area. However, to date, we have not demonstrated the presence of taste buds this close to the distal border of the hard palate.

From *Journal of Prosthetic Dentistry* **2**:66 (January) 1952.

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